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The OIL and GAS JOURNAL

PRODUCING REFINING ENGINEERING MARKETING

Published Every Thursday TULSA, OKLAHOMA, OCTOBER 10, 1929 $6.00 a Year

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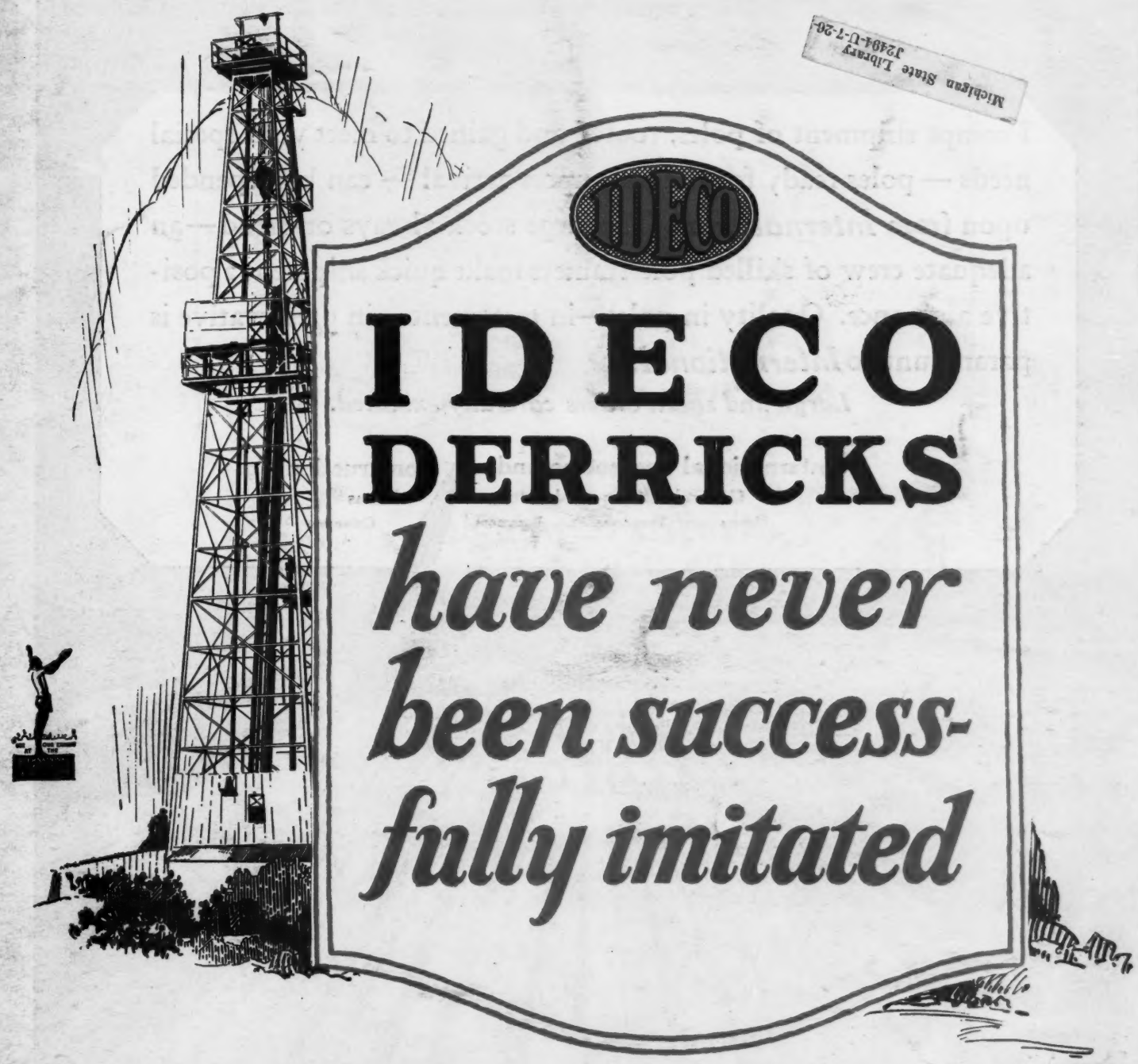

The International Derrick & Equipment Co.

Columbus, Ohio **Los Angeles, Cal.**

Plants: Columbus, Delaware, Ohio; Houston, Beaumont, Texas; Torrance, California. *Sales Offices:* Columbus, Ohio; New York City, N. Y.; Detroit, Michigan; Tulsa, Oklahoma; Fort Worth, Houston, Texas; Shreveport, Louisiana; Wichita, Kansas; Denver, Colorado; Los Angeles, California; Maracaibo, Venezuela. *Warehouses and Yards:* Columbus, Ohio; Tulsa, Seminole, Tonkawa, Drumright, Okemah, Wewoka, Maud, Sasakwa, Allen, Oklahoma City, Oklahoma; El Dorado, Wichita Heights, Kansas; Bakersfield, Taft, Torrance, California; Houston, Big Spring, Odessa, Pyote, Pampa, Borger, Mexia, Luling, Texas; Shreveport, Lake Charles, Louisiana; El Dorado, Smackover, Arkansas.

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Advertisers' Index on Page 49 Table of Contents on Page 50

Prompt shipment of poles, roofed and gained to meet your special needs — poles ready for the hole upon arrival — can be depended upon from ***International.*** The large stock always on hand—an adequate crew of skilled pole framers make quick shipment a positive assurance. Quality in poles—in treatment—in preservative is paramount to ***International.***

Large and small orders carefully executed.

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General Offices—Galveston, Texas

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International
creosoted Yellow Pine Poles

Forged Bronze Thread End

Forged Steel Ring

Forged Steel BOTTOM

The new Walworth KEWANEE 400

The new Kewanee 400 has a real reputation to sustain as it replaces the smaller sizes of the Kewanee Union that has been famous for so many years for its outstanding dependability in holding high pressure steam on the job.

The Kewanee 400 has the same tight ball-joint seat as the Kewanee Union and the same simple 3-piece construction. The 400's new Forged Steel Ring gives the ⅛ to 2-inch sizes greater strength to withstand slam-bang disconnections—and plenty of them.

Steam Working Pressure Ratings

KEWANEE 400		
⅛ to 2 ins.	400 lbs.	500 deg. F.

KEWANEE UNION (Malleable Ring)		
2½ to 3 ins.	250 lbs.	500 deg. F.
3½ to 4 ins.	200 lbs.	450 deg. F.

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Walworth Company, General Sales Offices: 51 East 42nd St., New York
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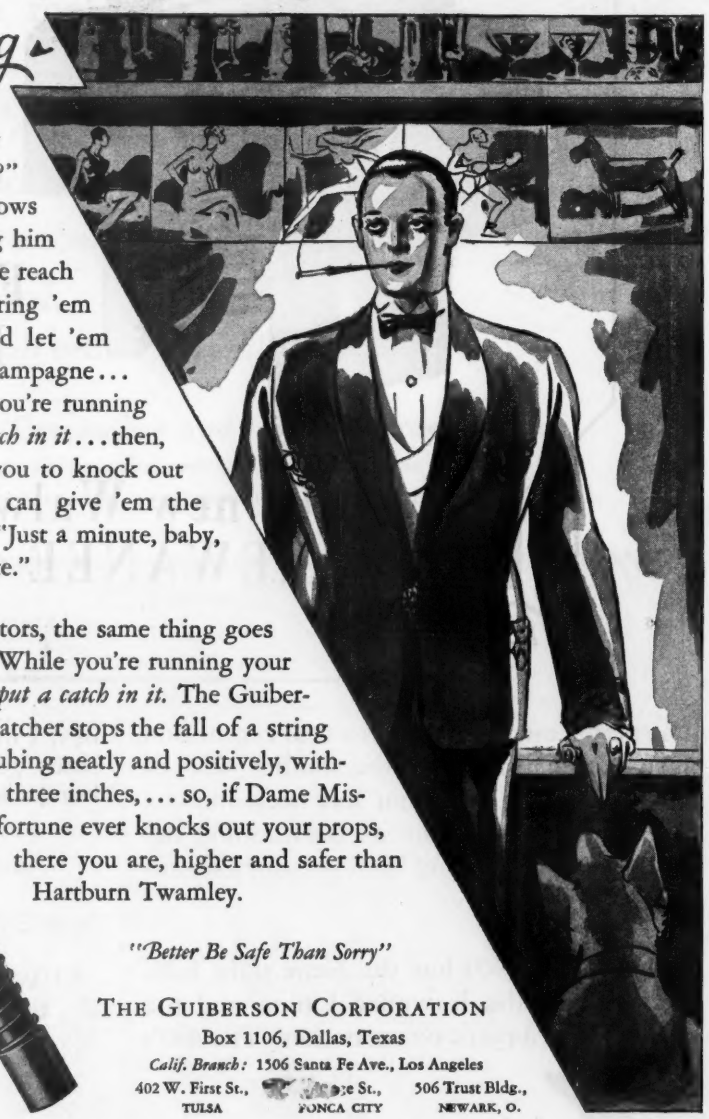
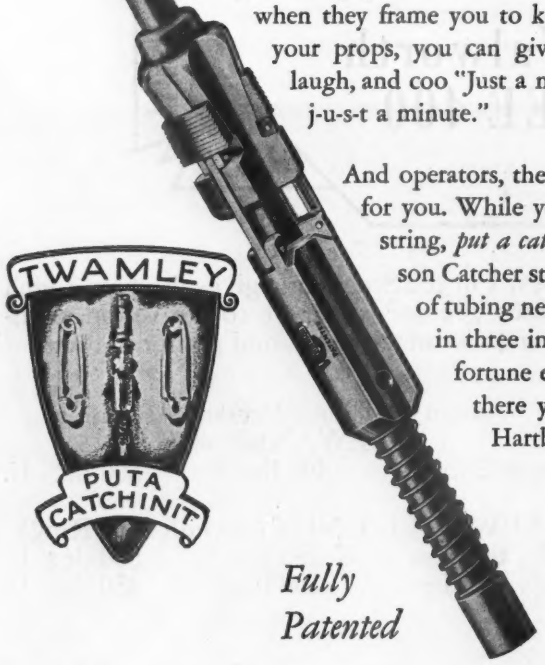
The Oil and Gas Journal, issued weekly by The Petroleum Publishing Company, 114-116 West Second Street, Tulsa, Oklahoma. Subscription price $6.00 a year; 15 cents a copy. Entered as second-class mail matter December 15, 1911, at the post office at Tulsa, Okla., under the Act of March 3, 1879.

Hartburn Twamley

New York's most successful bachelor, endorses the principle of the Guiberson Catcher to keep from falling



"The older they get, the harder they fall," cry the sages. "Oh, yeah?" scoffs Hartburn Twamley and follows a simple rule which is keeping him safely suspended far out of the reach of Manhattan's mamas. String 'em along all you want, and let 'em swallow it down like champagne... but, *remember*, while you're running your string, *put a catch in it*... then, when they frame you to knock out your props, you can give 'em the laugh, and coo "Just a minute, baby, j-u-s-t a minute."



Fully Patented

And operators, the same thing goes for you. While you're running your string, *put a catch in it.* The Guiberson Catcher stops the fall of a string of tubing neatly and positively, within three inches,... so, if Dame Misfortune ever knocks out your props, there you are, higher and safer than Hartburn Twamley.

"Better Be Safe Than Sorry"

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GUIBERSON

BETTER BE SAFE THAN SORRY

STANDARDIZE ON THESE THREE BEARING METALS

—*scientifically designed to meet 95% of all needs*

Standardization on scientifically designed bearing metals offers a plant two definite advantages. *First,* security of uniform, smooth plant operation. Bearing metal troubles—a single bad bearing—may cause expensive delays. Not only must bearings be made of pure metals, free of dross, but they must be designed to fit needs *exactly.*

Second, economy in cost and maintenance, besides the freedom from worry.

The Eagle Bearing Service, constantly studying the bearing needs of different industries, has developed three bearing metals that meet 95% of all bearing requirements. These three metals are described and discussed in a free book which we will gladly send, without obligation, to bearing metal users.

Simply mail the coupon. *The Eagle-Picher Lead Company, Chicago, Joplin, Cincinnati.*

FREE BOOK!

This book describes the properties and uses of the three Eagle Bearing Metals designed to meet 95% of all requirements. It describes, also, the Eagle Bearing Service, which studies free of obligation the bearing needs of *your* plant, making suitable recommendations.

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1 *Eagle Dreadnaught High-Speed Bearing Metal*—for extreme speed and heavy pressure conditions.

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Please send me, without obligation, your free Eagle Bearing Metal Book.

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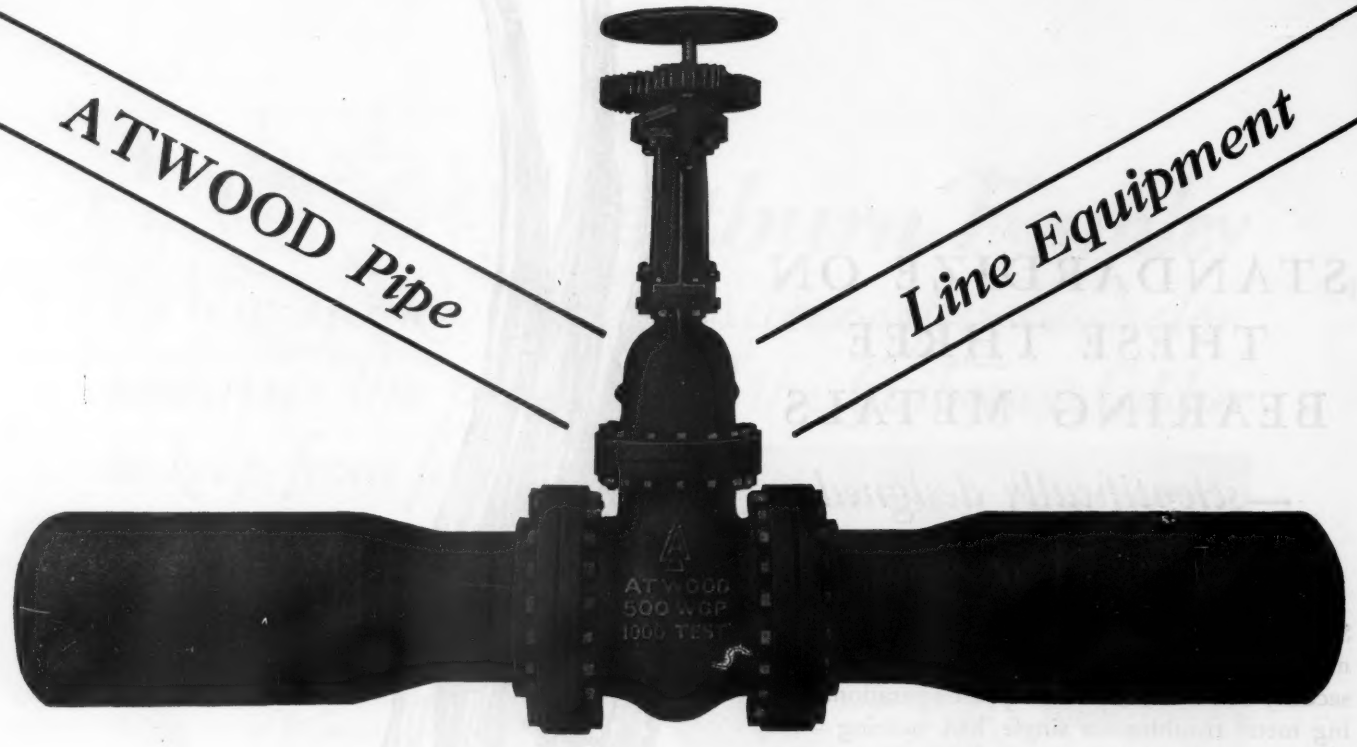
REG. U. S. PAT. OFF.

ATWOOD Pipe Line Equipment



ATWOOD Swedged Welding Nipple, swedged from 22" to 18". Advanced type Gas valve, 500 lbs. working pressure, tested hydrostatically to 1000 lbs., ATWOOD High Tensile Iron body, O. S. & Y., spur gear operated.

SWEDGED Welding Nipples • Welded River Crossings • ATWOOD Joints • Piping of every description • designed • fabricated • erected • Valves for every Oil and Gas service • Fittings • the ATWOOD Line is complete.

Many of the most complex problems of Pipe Line Control have been solved by ATWOOD Engineering Service—and solved practically by ATWOOD design—made *trouble-proof* after the line has been put in operation by ATWOOD-Manufactured equipment.

No matter how tough—if there is a way to do a Pipe Line job—ATWOOD Service will find it and design accordingly the most efficient and economical installation. Feel free to call upon our Engineering Service at any time concerning any job you may have under consideration.

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STANDARD OF THE OIL FIELD

There is no denying the best recommendation any product can offer is the approval of its users. More McCord force feed lubricators are in use in the oil fields, giving satisfactory service, than all other makes combined.

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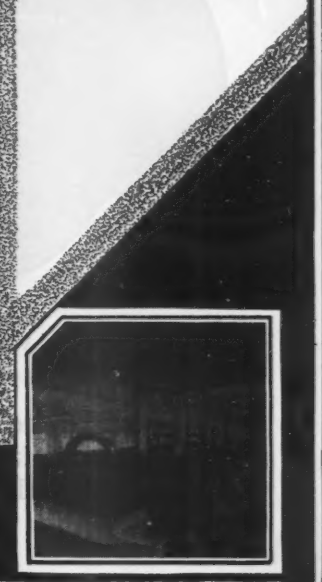

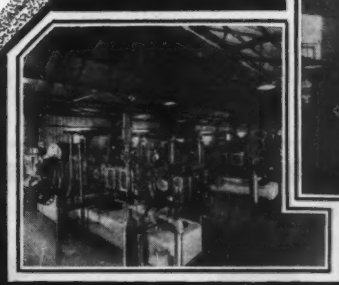

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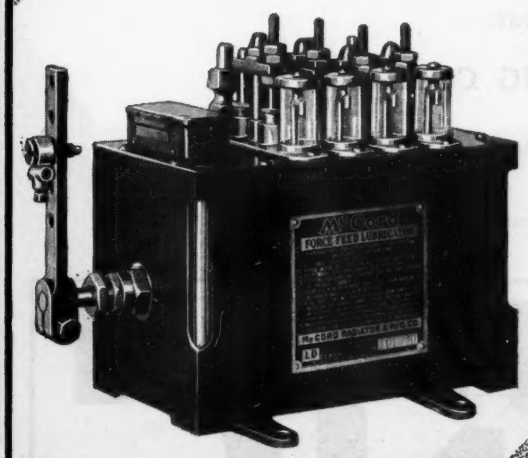
McCord Equipped



McCord Radiator & Mfg. Co.
LUBRICATOR DIVISION
Detroit, Mich.

RESERVE STRENGTH

The average valve *might* hold in the emergency. But when the protection of your men and wells depends on a "might" it is better to look for something more sure.

Darling *Forged* Steel Valves have the reserve strength you need. You can secure this comfortable margin of safety at a slightly additional cost over *cast* steel valves. It is certainly worth it.

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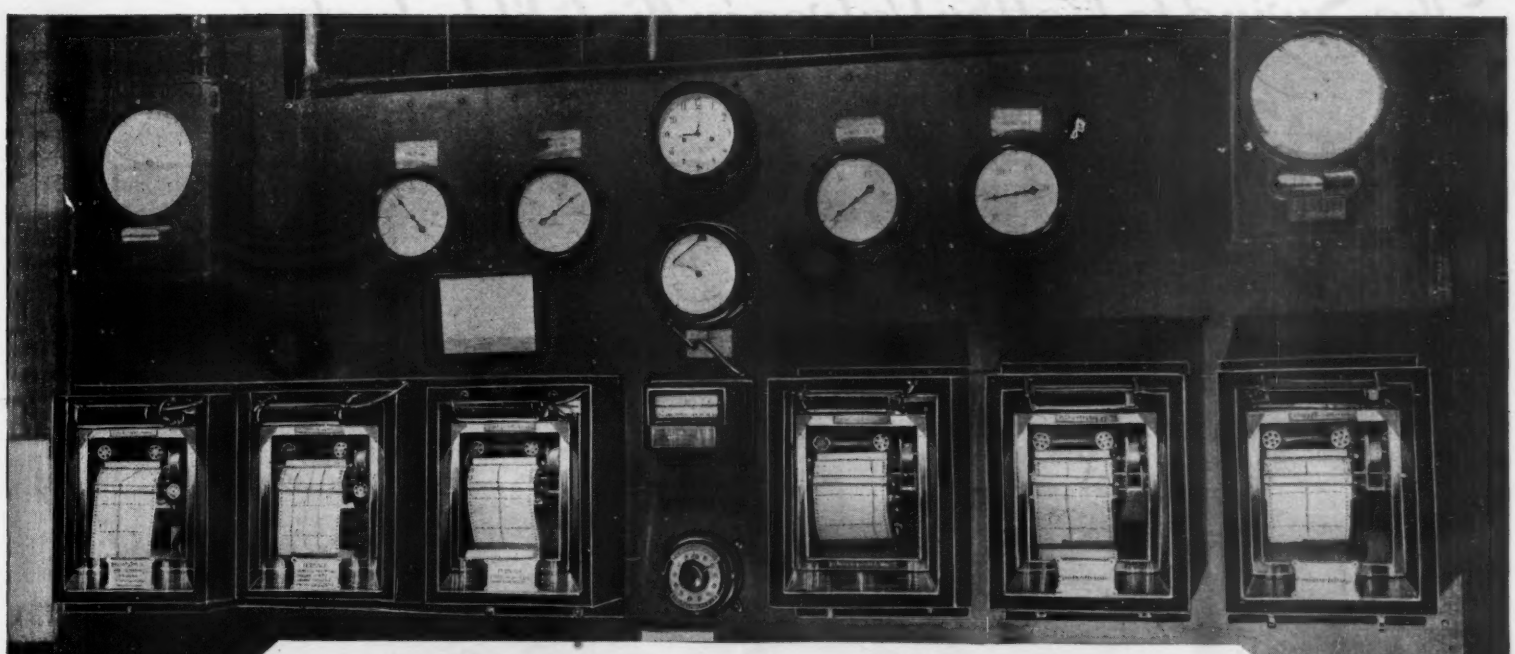
FORGED STEEL DARLING DRILLING GATE VALVES



Controlling

Cross Unit at Lincoln Refining Co.

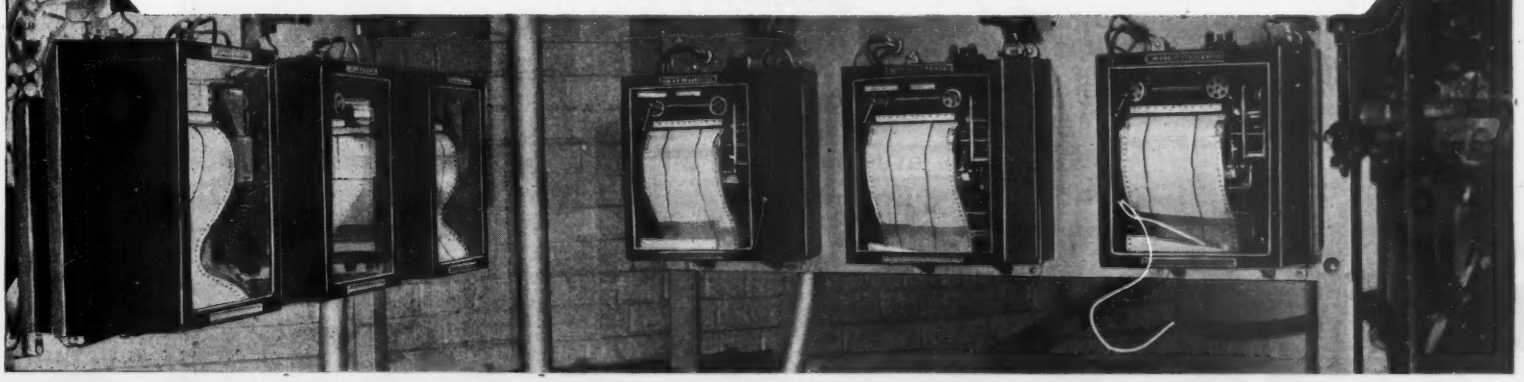
IN line with the general practice now followed by refineries producing quality products, within close competitive cost limits, the Lincoln Refining Company, Robinson, Illinois, has installed highly modern and efficient instrument equipment for still and tower control.

The installation shown above is used to control the Cross cracking unit at this plant. The instruments include a Brown Duplex Pyrometer and CO_2 Meter to record $\%CO_2$ in flue gases and temperature of preheated air; also temperatures of flue gases entering and leaving the preheater. There are Brown Pyrometers to record temperatures of the furnace bridge wall, hot oil outlet, vapor separator, preheater oil outlet, etc. A Brown Indicating Pyrometer is used to check these and various other temperatures all along the line. A Brown Thermometer is used for recording the lower temperatures. The Brown Automatic Control Recording Pyrometers on the board regulate the tower temperatures. There are also several Brown Indicating Pressure Gauges in this installation.

Brown Instruments can be advantageously applied to indicate, record and automatically control temperatures, pressures, liquid level, etc., for the economical production of any range of petroleum products within close specification limits.

Write for information.

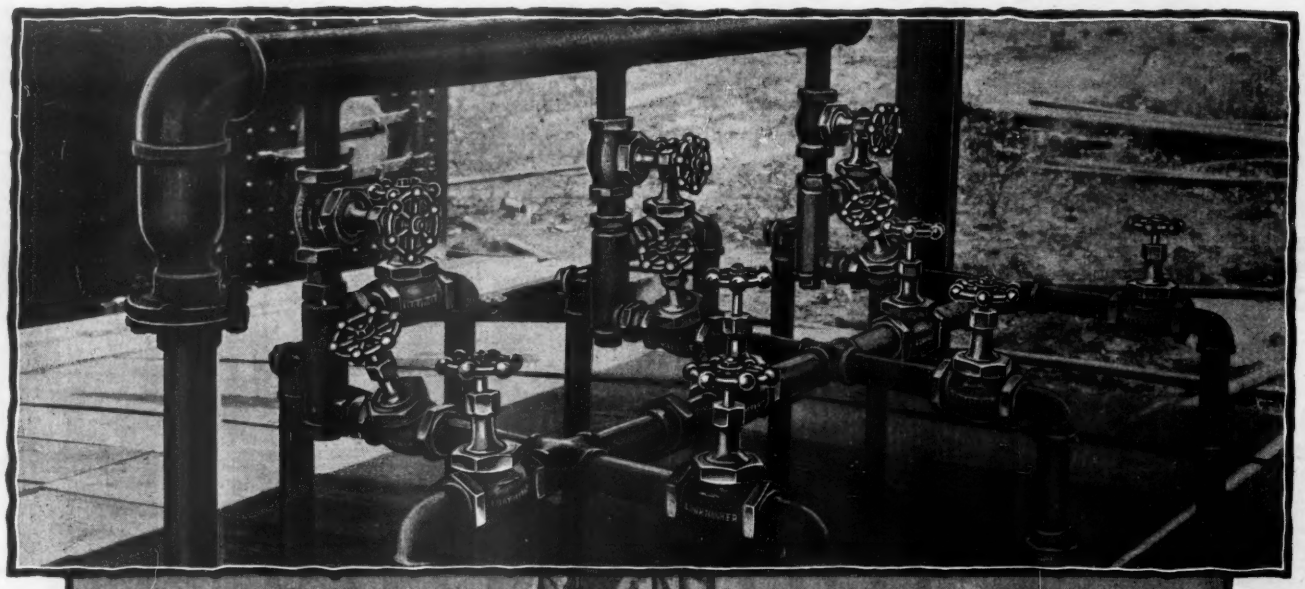
THE BROWN INSTRUMENT COMPANY
4488 Wayne Avenue, Philadelphia, Pa.
Branches in 20 principal cities.



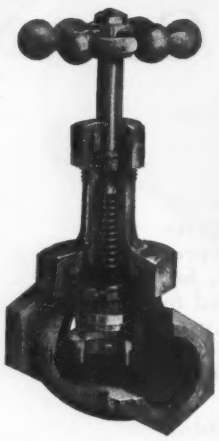
Brown Automatic Controls

"To measure is to economize"

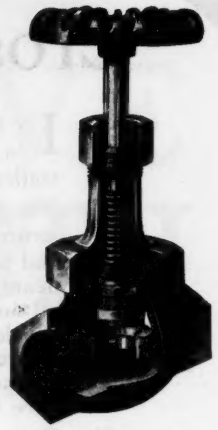
The Swing to Better Valves in the Oil Industry



LUNKENHEIMER "FERRENEWO" VALVES IN OIL FIELD SERVICE IN OKLAHOMA



Iron Body "Ferrenewo"
150 lb. W. S. P.



Bronze "Renewo"
Medium-200 lb. W. S. P.
Extra Heavy-300 lb. W. S. P.

In these days of keen competition, the oil and gas industry realizes the importance of installing high grade valves to effectively control the flow of steam, gas, oil and other liquids without wasteful leakage.

Fighting hard to reduce production costs, the Industry is buying valves on the basis of *Ultimate* cost over long periods of time. Lower maintenance expense, increased safety and less time out for delays are the deciding factors which influence valve purchases.

So it is, that in practically all oil and gas fields, Lunkenheimer Valves will be found showing the way to better service and lower valve costs. They bring to the Industry a time tested and time-honored product that always measures up to the exacting requirements of the most discriminating valve users.

For the utmost in valve value specify and insist upon getting "Lunkenheimer."

Distributors are located in all oil centers. They will fill your requirements promptly.

The Lunkenheimer Company manufactures a complete line of Bronze, Iron and Steel Valves: Gate, Globe, Angle, Check, Blow-off, Non-return, Pop Safety and Relief, Lubricators, Oil Pumps, Oil and Grease Guns, Whistles, Cocks, Fittings, etc. Literature describing any of these products will be sent upon request.

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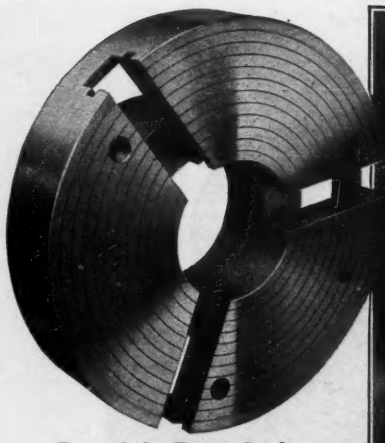
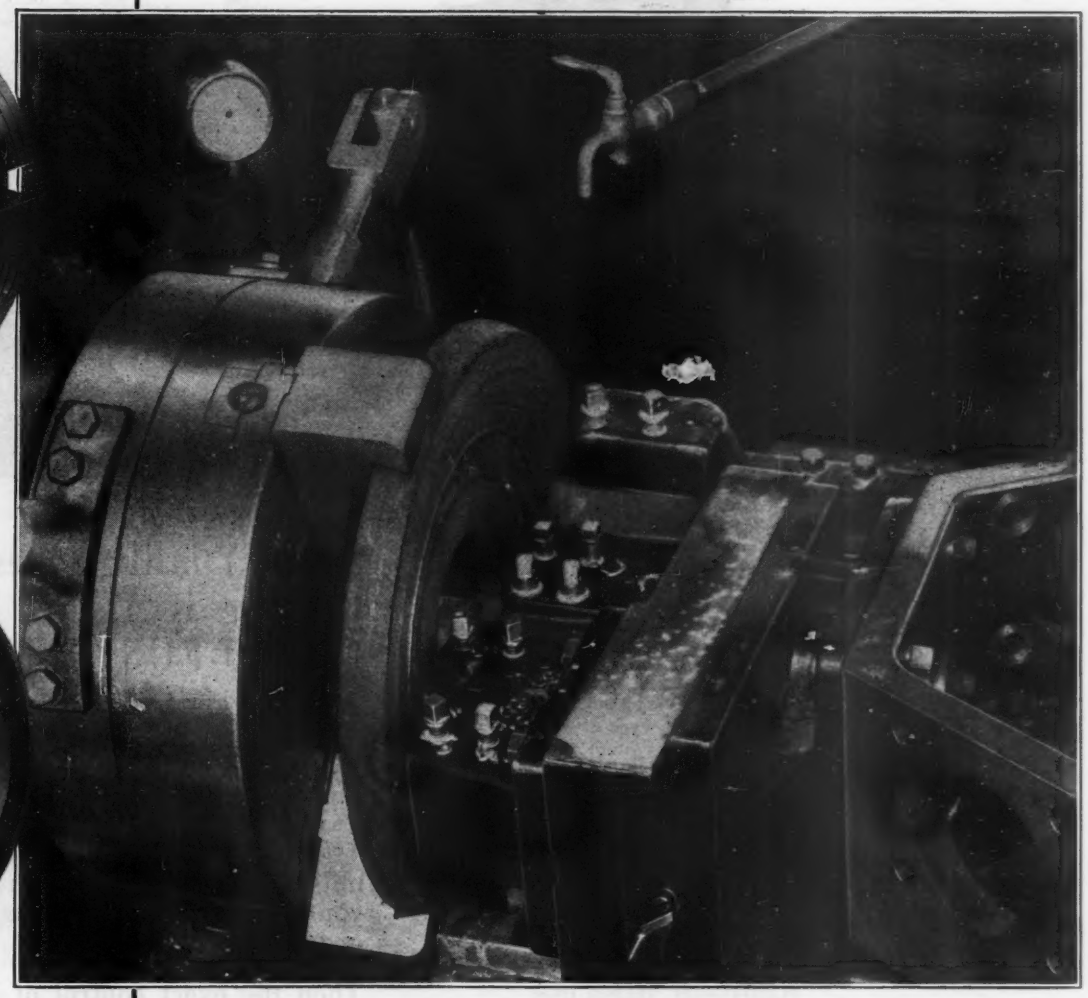
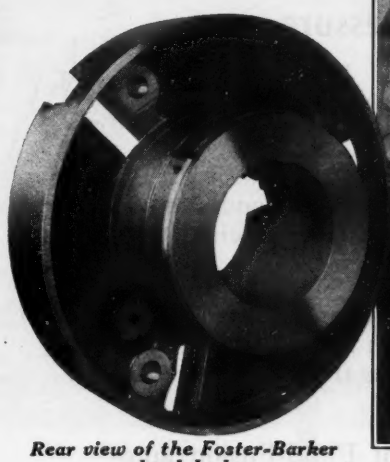
Tremendous Gripping Strains



Face of the Foster-Barker chuck body





Rear view of the Foster-Barker chuck body

Realizing the problems confronting casting buyers, Sivyer periodically publishes new booklets on the intricacies and developments of steel castings. The latest is "Dependability in Steel Castings." Ask for a copy.

but no trouble or breakage

Whenever a manufacturer has a good name, or the sales volume that goes with a good name, to uphold, you are likely to find Sivyer among his important suppliers. For this Foster-Barker Chuck and Vise installation, the Foster Machine Company uses chucks' bodies cast in Sivyer Steel. Under hydraulic operation, especially, these units are subjected to tremendous, constantly gripping strains. Yet the Foster Machine Company reports no breakage or trouble with Sivyer Steel.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

3" thick wall
10' diameter
50' long

SAFETY in High Pressure Cracking is Assured with FLUID-FUSION Welded Vessels

Cracking operations using the most extreme pressures and temperatures are conducted in perfect safety when Fluid-Fusion welded vessels are employed.

The absence of wall-thickness restrictions permits a design of vessel with the factor of safety your operations require regardless of pressure or temperature.

Then the exact control of Fluid-Fusion automatic machine welding, the careful thoroughness of P. I. W. fabrication, furnace annealing and exhaustive testing all combine to transform this design into the safest kind of vessel for high pressure and temperature operation.

The nearest P. I. W. sales office will give you complete information about Fluid-Fusion cracking stills.

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FLUID-FUSION WELDED HIGH PRESSURE VESSELS
TANKS—UP TO 120,000 BBLS.
TANK CARS
STEEL BARRELS AND DRUMS
STEEL PLATE CONSTRUCTION

P.I.W.
STEEL PLATE CONSTRUCTION

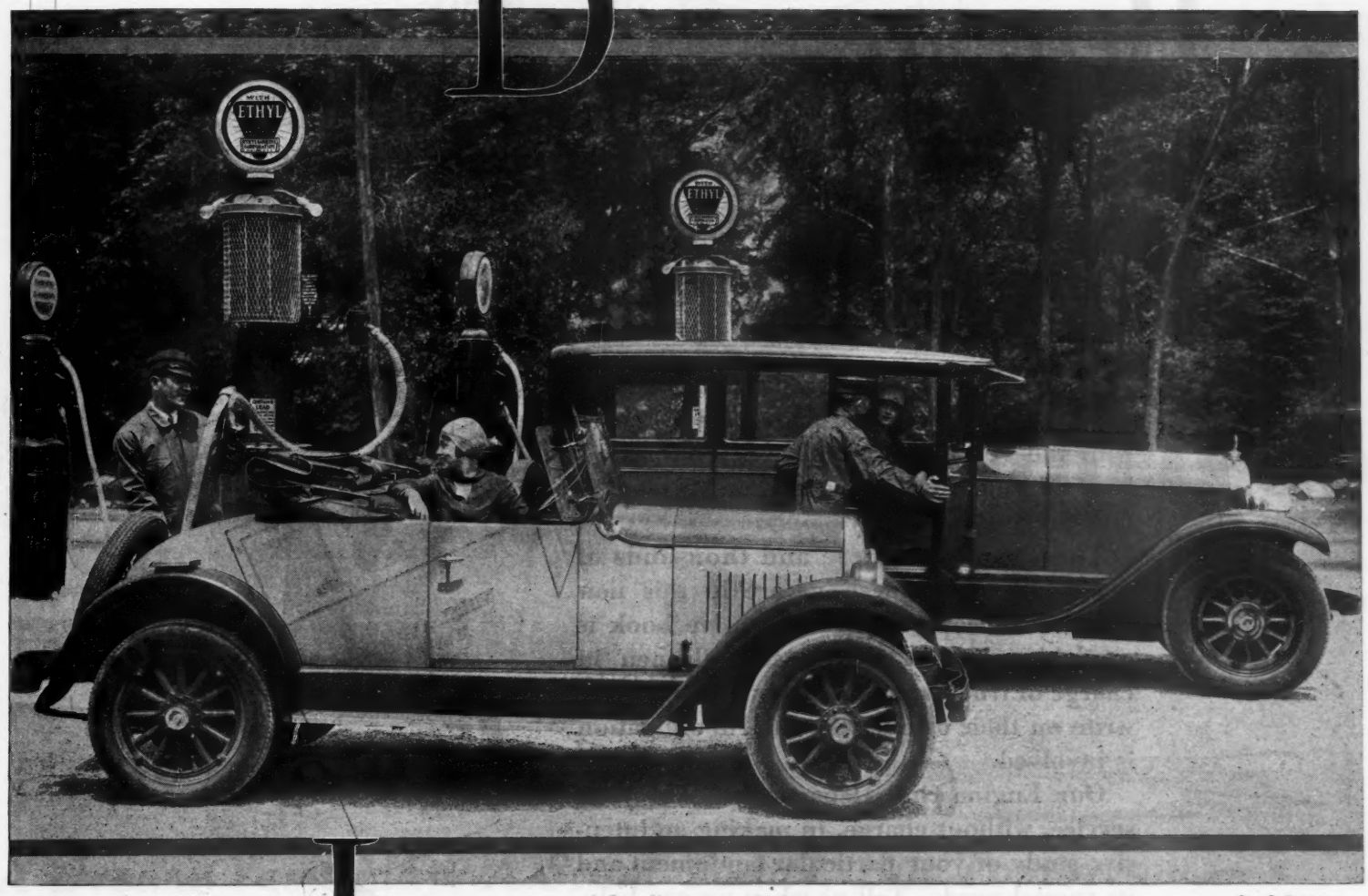
The Petroleum Iron Works Company

Sharon, Pa.

New York Chicago Tulsa

FLUID-FUSION WELDED CRACKING VESSELS

Big cars



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and Little cars do better *on Ethyl*

A $5000 car and a $500 car have one thing in common. Both depend on gasoline; both are handicapped by its "knocking" tendency.

That is why you see big cars and little cars meeting at the Ethyl pumps which now cover the United States, Canada and Great Britain. They are filling up with good gasoline *plus* Ethyl fluid, the vital compound developed by General Motors' Research Laboratories to eliminate "knocking" and develop all the power inherent in any engine.

To the owners of small cars as well as big, Ethyl Gasoline is a real economy. By "knocking out that knock" Ethyl saves engine wear and tear and repair bills. It reduces vibration and depreciation. It gives better control in heavy traffic. It eases strain on hills and heavy roads. And if you enjoy driving, Ethyl will give you a brand-new thrill.

Try riding with Ethyl today. It improves the performance of any car. Look for the Ethyl emblem.

Knocks out that "knock"

Ethyl Gasoline Corporation, 25 Broadway, New York City; 56 Church Street, Toronto, Canada; 36 Queen Anne's Gate, London.

ETHYL GASOLINE

Here are the money-saving *answers* to *questions* you have asked!

THE new Fisk Wheel and Rim Manual is now ready. Filled from cover to cover with the very information that you MUST have if you are to operate at lowest cost and greatest efficiency.

The answer to these and thousands of other important questions are in this new Manual. A copy of this expensive book is available, without charge, for all men in charge of truck and bus fleet operations, who write on their own letterhead. No obligation is involved.

Our Engineering Department is at your service, without charge, in making an intensive study of your particular equipment and its special needs. Tell us when we can help.

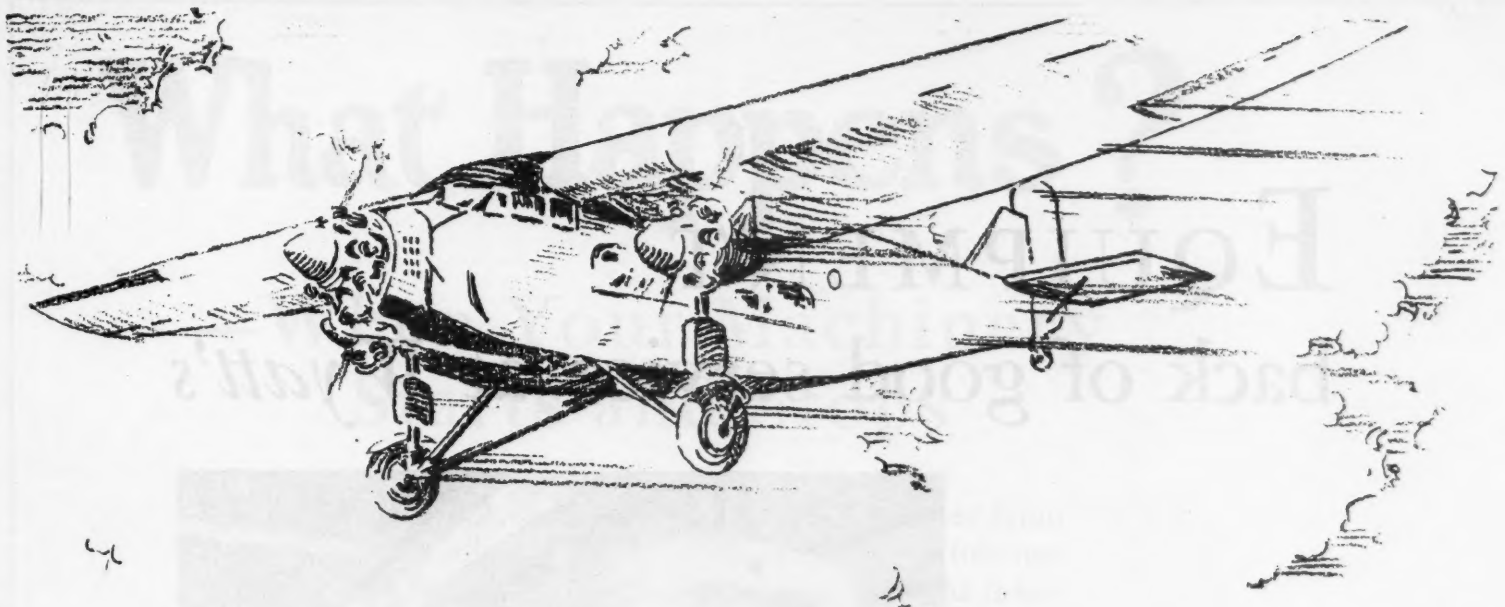
Inquiries for the new Wheel and Rim Manual should be addressed to

THE FISK TIRE COMPANY, INC.

Commercial Tire Dept.

CHICOPEE FALLS, MASSACHUSETTS

FISK



New York to San Francisco in 18 hours

A Dream Yesterday, A Stunt Today, But Tomorrow,— A Commercial Possibility. Such Is the Progress of Business.

The Frates Company is keeping pace with this business progress and now offers to its clients complete coverage for the commercial airplane. Policies are written to conform to the requirements of each individual case as the various conditions are met with broad and elastic forms drafted by experienced aviators and underwritten by a group of companies of unquestioned reputation. This group now issues policies to cover more aircraft than all other companies combined. Claim service is rendered by our own claim department. If you are operating a plane in your business you will be interested in knowing the details of this coverage and service.

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EQUIPMENT
back of good service at *Wyatt's*

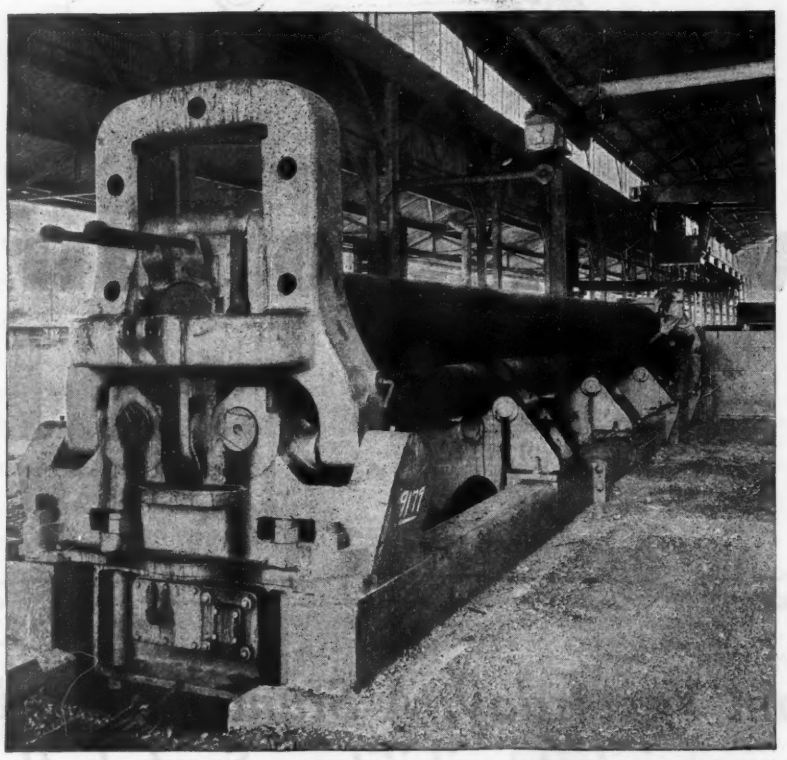


PLATE BENDING ROLLS

PLATE BENDING ROLLS thirty-six feet long attracted much interest during the recent visit of Houston purchasing agents to the new plant of Wyatt's.

This machine has a capacity for rolling or bending three-fourths inch plate thirty-six feet long to a radius of thirty inches or one and one-half inch plate seven feet long to the same radius. It is particularly attractive to the Refining and Natural Gasoline Industries because of the necessity for heavier vessels to meet the demand for higher pressures and temperatures and to resist corrosion.

WYATT METAL & BOILER WORKS
DALLAS *Capital $1,000,000* HOUSTON

Wyatt's **WYATT METAL & BOILER WORKS**

What Happens ?

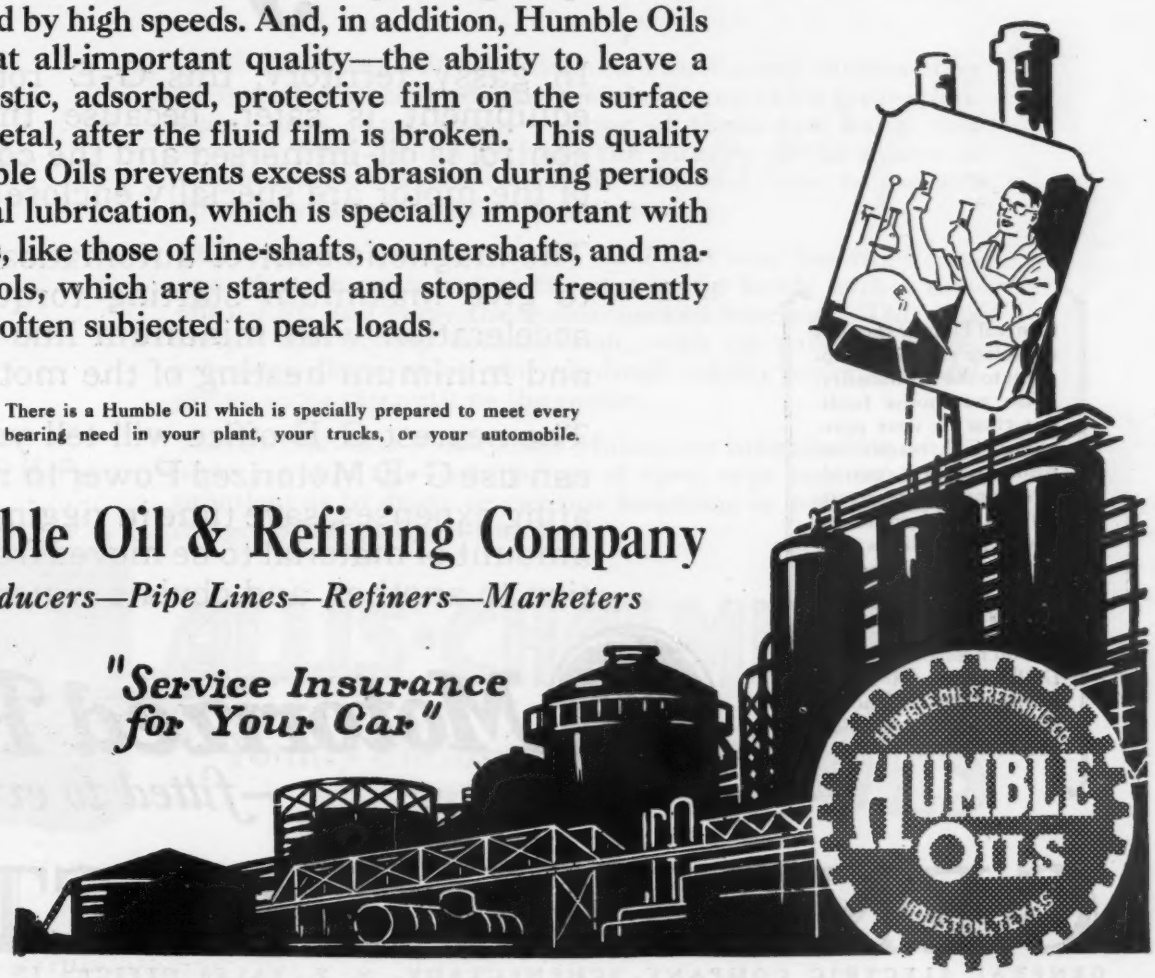
—When Your Machinery Starts and Stops

Much of the wear and tear on machinery comes from starting and stopping. For then the fluid film of lubrication is broken, *and unless you are using the right lubricant,* friction takes a heavy toll.

As long as the fluid film is intact, the quality of the lubricant is not so important—but when the fluid film breaks, as it does every time you start and stop a machine—the quality of the lubricant supplied to the bearings is of prime importance, if friction is to be kept from doing serious damage.

After exhaustive tests, scientists in our laboratories developed Humble Oils, which retain the proper viscosity and hold their fluid film at the operating temperatures produced by high speeds. And, in addition, Humble Oils have that all-important quality—the ability to leave a semi-plastic, adsorbed, protective film on the surface of the metal, after the fluid film is broken. This quality in Humble Oils prevents excess abrasion during periods of partial lubrication, which is specially important with bearings, like those of line-shafts, countershafts, and machine tools, which are started and stopped frequently and are often subjected to peak loads.

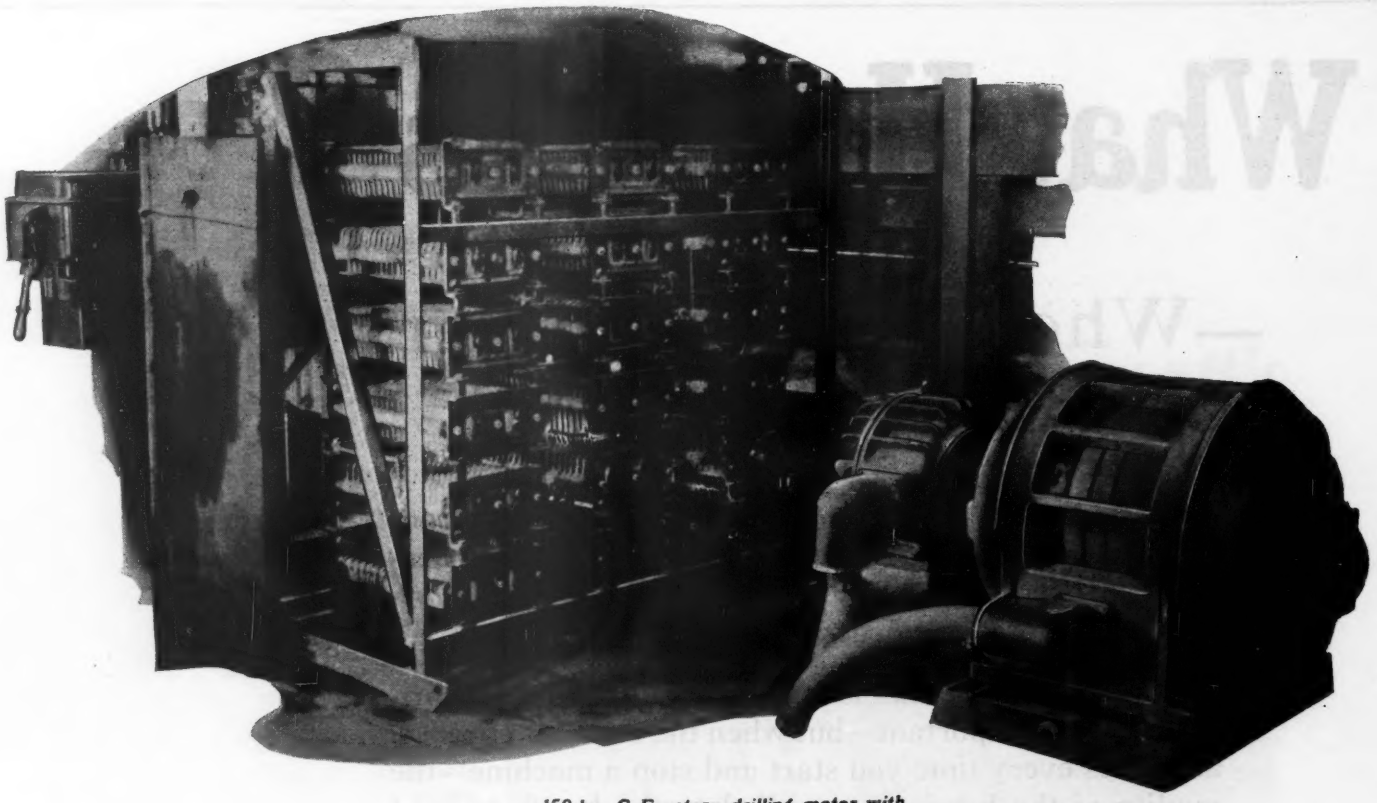
There is a Humble Oil which is specially prepared to meet every bearing need in your plant, your trucks, or your automobile.



Humble Oil & Refining Company

Producers—Pipe Lines—Refiners—Marketers

"Service Insurance for Your Car"



150-hp. G-E rotary drilling motor with oil-immersed control, Kettleman Hills Field, California

For Gassy Wells

In gassy territory, this G-E rotary drilling equipment is safer, because the magnetic control is oil-immersed and the collector rings of the motor are specially enclosed.

The magnetic control automatically operates to give maximum starting torque and fast acceleration with minimum line disturbance and minimum heating of the motor.

The nearest G-E office will tell you how you can use G-E Motorized Power to reduce operating expenses, save time in rigging, reduce the amount of material to be moved from one location to another, and obviate water bills.

General Electric supplies complete electric equipment to the oil industry. With warehouse facilities close to your operations, G.E. readily furnishes motors, controllers, transformers, arresters and other protective devices, capacitors for power-factor improvement, switching equipment, etc.

G-E oil field specialists at: Dallas, Denver, Houston, Kansas City, Oklahoma City, Tulsa, Los Angeles, San Francisco.

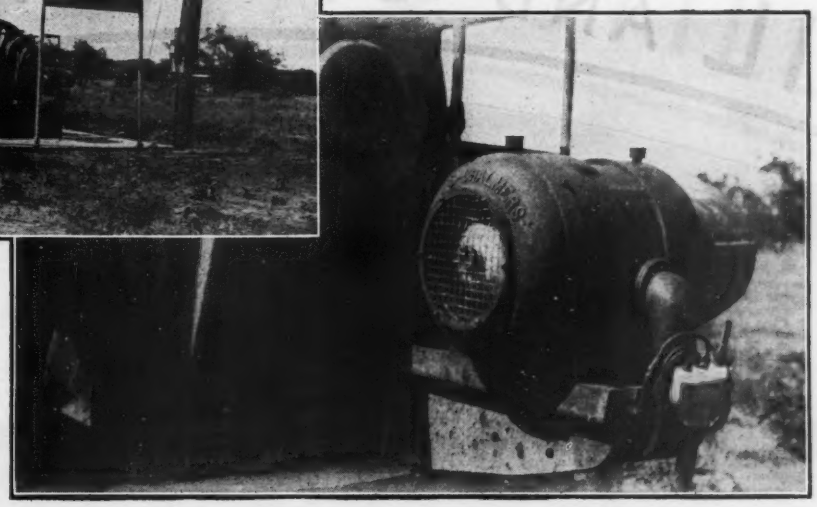
GE Motorized Power
—fitted to every need

200-304 A

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

3 H.P. Type "ARZ" Motor driving an Oil Well Pumping Jack near Baird, Texas.



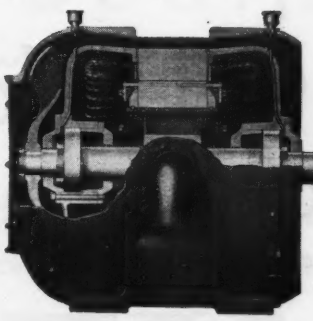
Rain and Dirt Cannot harm this motor

Allis-Chalmers Totally Enclosed Fan-Cooled Motors may be installed almost anywhere without any extra protection. Rain, dust, sand, gases — none of them can harm this motor. They cannot get into the interior of the motor or the bearings. A glance at the sectional view below will show how this protection is obtained.

The windings are enclosed by solid cast iron bearing housings that are attached to the stator end heads with a machined fit, and carry the grease packed bearings. This is a simple and sturdy construction, with no rubbing or revolving seals, making the windings readily accessible and giving extra strength to the motor.

Standard sizes from 2 to 40 H. P.

Totally Enclosed Fan-Cooled Motors are intended for severe service where the installation of open type motors is not practical as in dusty or gaseous locations or where there is danger of oil soaked windings.



ALLIS-CHALMERS

Totally Enclosed Fan-cooled MOTORS

AT THE INTERNATIONAL ★SMITH OIL AND GAS LINE PIPE

Shipment of 3 trainloads of SMITHWelded Pipe

Don't Miss This Opportunity that the Whole Oil World

A. O. SMITH CORPORATION

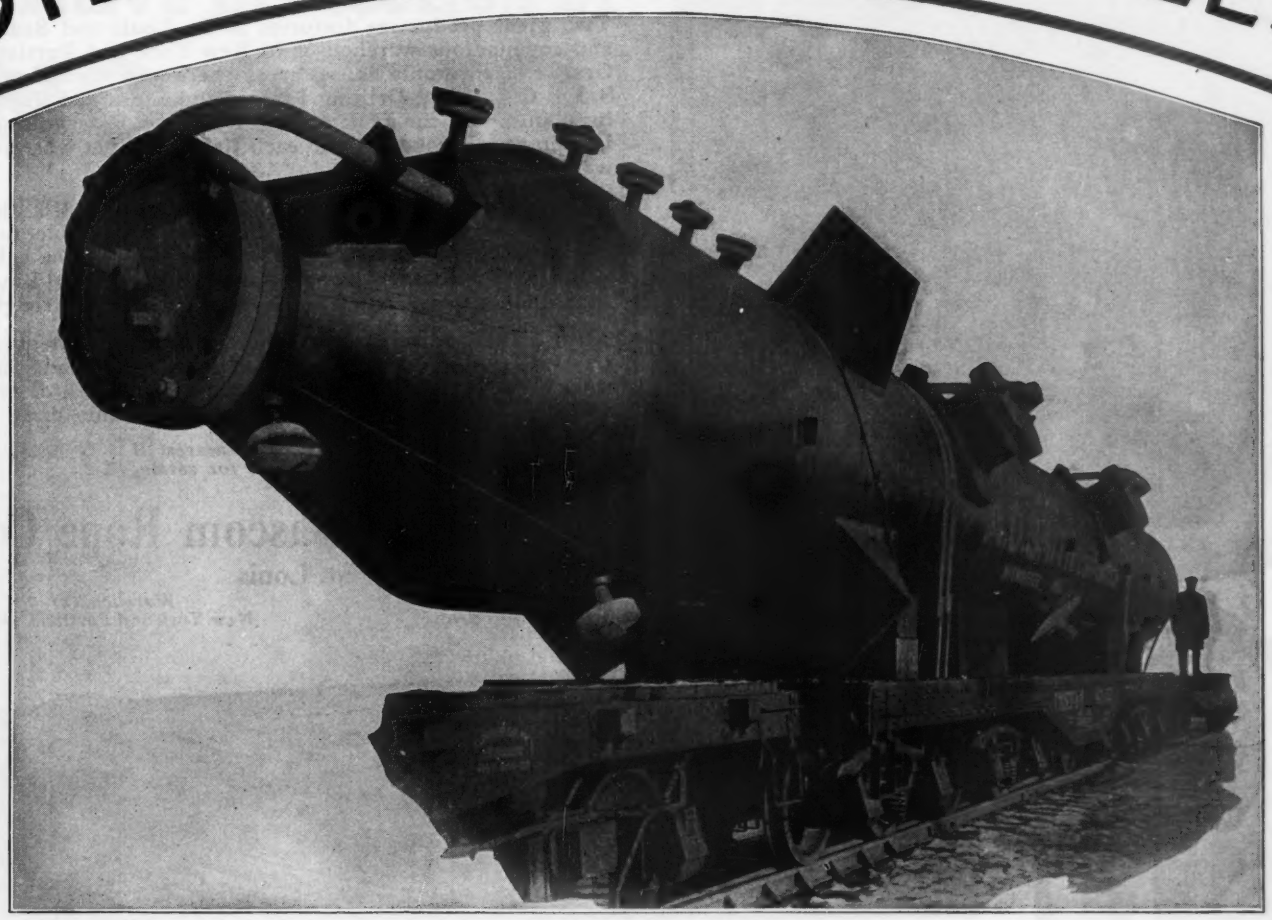
General Offices: Milwaukee, Wisconsin

★SMITH

PETROLEUM EXPOSITION

WELDED★

OIL CRACKING STILLS



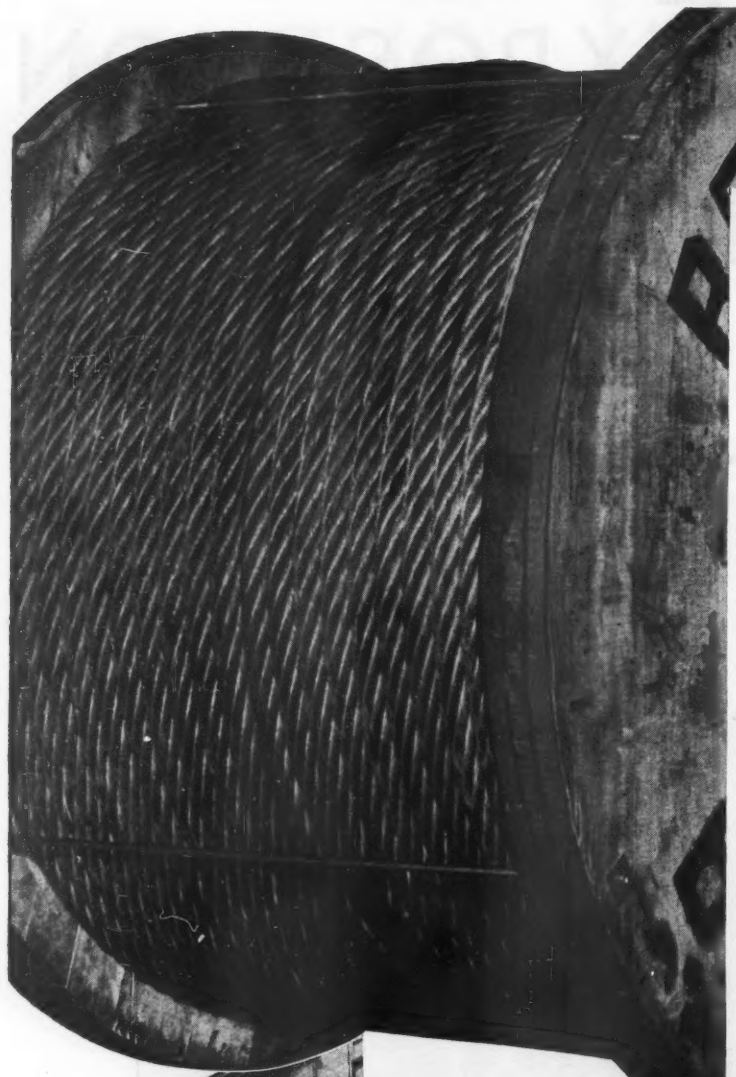
A SMITHWelded Cracking Still

of Seeing the Equipment is Talking About . . . .

Oil and Gas Fields Products Division

District Offices: New York · Tulsa · Los Angeles · Houston

WELDED★



IT'S A MIGHTY BIG "OUTFIT"

which provides the petroleum industry all over the world with that vitally important part of its equipment—dependable wire line.

Two great productive factories in St. Louis and Seattle and commodious warehouses in New York and Portland, Oregon, keep supply houses everywhere well stocked with B & B Cable Tool Drilling Lines, Sand Lines and Pumping Lines, and the famous Yellow Strand Rotary Lines, laid up to suit conditions in each field. You get what you want *when you want it.*

Broderick & Bascom began making wire rope in 1876, were pioneers in designing special drilling cables—pliable, easy running lines that spell speed and economy in the cable tool field; and invincible Yellow Strand Rotary Lines, supremely elastic, non-crushing, and of uniform strength.

All B & B Lines are made of wire drawn to our own specifications and tested four ways before being made into rope. Machinery of exclusive design. Workmen of ripe experience. Result: Good, uniform, dependable lines.

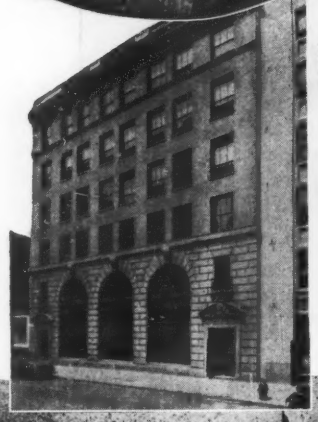
If you don't know name of nearest B & B Distributor, ask us. Write for catalog K-2.

Broderick & Bascom Rope Co.

St. Louis

Factories: St. Louis and Seattle

Warehouses: New York and Portland, Ore.

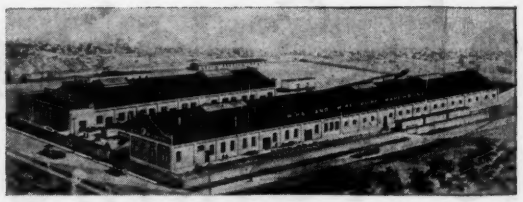


New York Office and Warehouse

St. Louis Factory

New St. Louis Office

Portland, Ore., Warehouse



Seattle Factory

BRODERICK & BASCOM DRILLING LINES

N594

S A V E

Your pipe with NO-OX-ID's proven long-time chemical and mechanical protection:

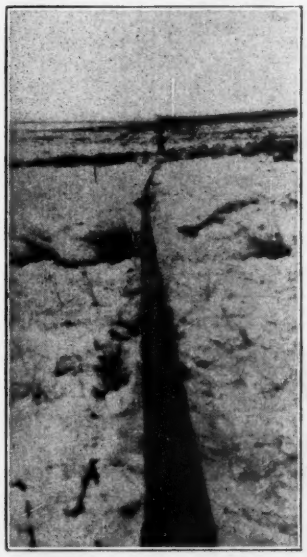
Freight because less tonnage is required per mile of line:

Labor cost due to ease of application:

Save your pipe with the positive protection of

NO-OX-ID

NO-OX-ID and NO-OX-ID-IZED Wrapper are being applied to meet the most severe conditions at a cost of 50% of many other coatings.



The real cost of protecting steel pipe line should be based on the cost of the line in the ground.

Inquire as to the most recent developments.

Dearborn Chemical Company

"A House of Chemical Engineers" In Its Forty-first Year of Service to Industry.

310 South Michigan Ave., Chicago
205 East 42nd St., New York

Canadian Offices and Factory: 2454-2464 Dundas St., West, Toronto

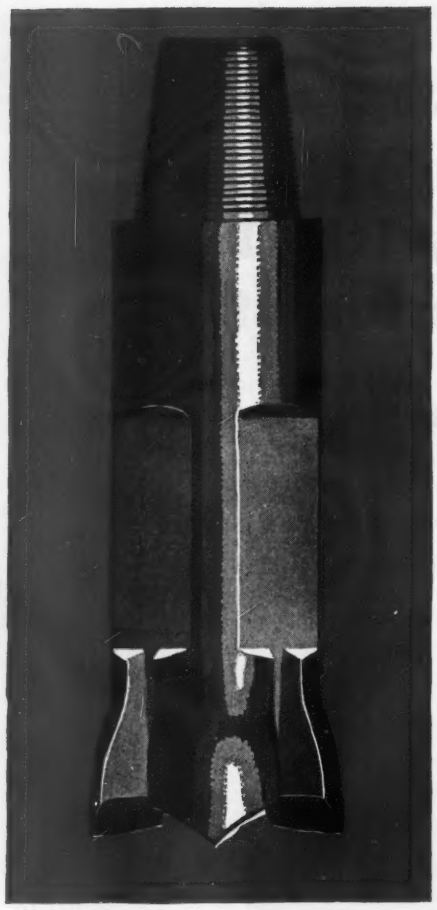
NO-OX-ID

IRON + OX = RUST

TRADE MARK

The Original Rust Preventive

More footage OF dependable core



at a minimum cost per foot of core recovered!

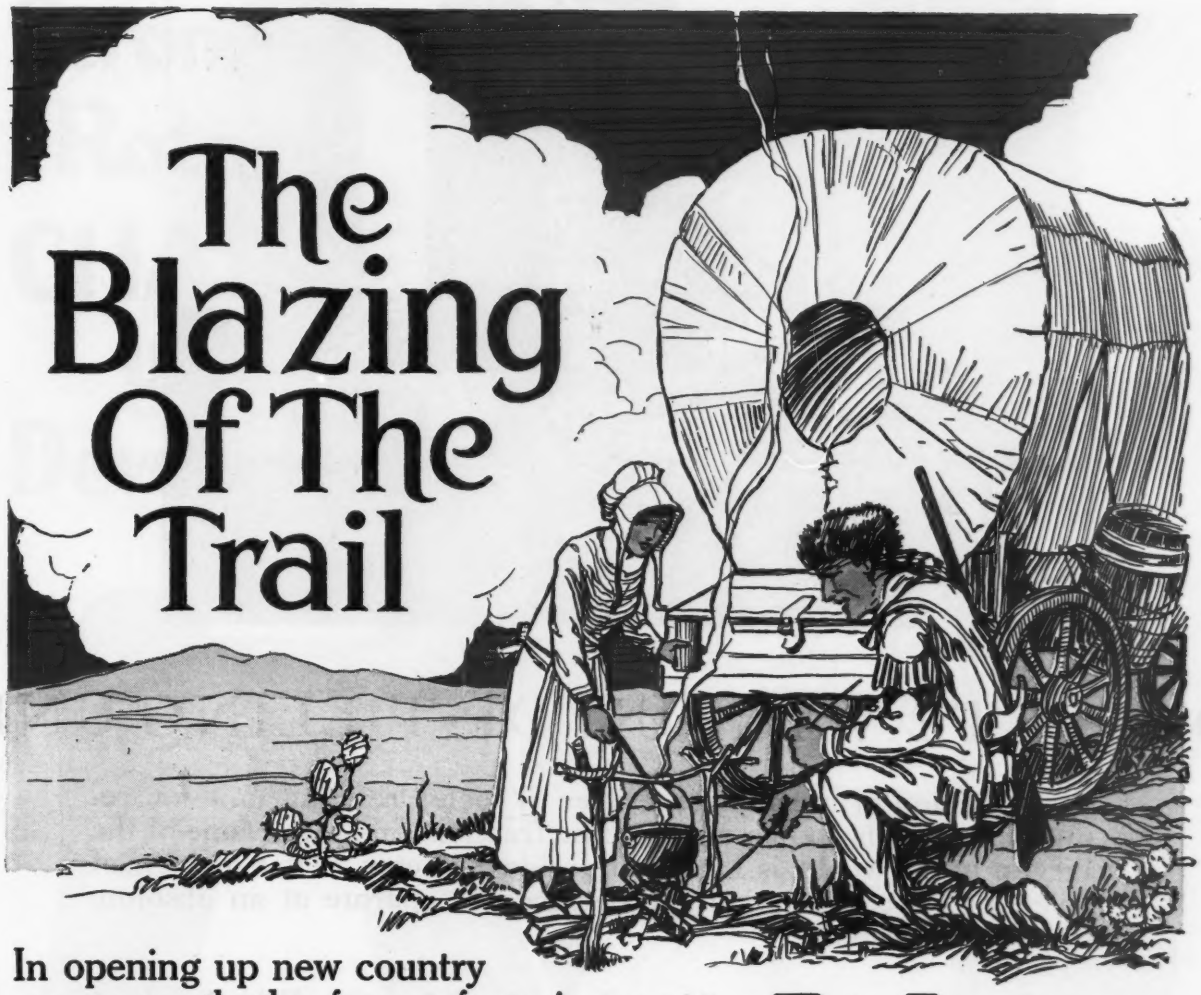
The basis of Elliott supremacy throughout the oil fields of the world.

Write us at once for descriptive catalog of Elliott Core Drills for cable tools.

ELLIOTT CORE DRILLING CO.
850 Subway Terminal Building
LOS ANGELES, CALIFORNIA

Export Office:
150 Broadway, New York
Distributed exclusively in the United States east of the Rocky Mountains, by
HINDERLITER TOOL COMPANY
of Tulsa, Okla.

ELLIOTT Core Drills



In opening up new country or new methods of manufacturing practice, the pioneers bear the brunt of blazing the trail, overcome dangers and make the way safe.

The Henry Vogt Machine Co. were the pioneers of Drop Forged Steel Valves and Fittings. They have kept pace with industrial development and have met every modern demand in Drop Forged Steel Valves and Fittings for high pressure and temperature work. Vogt Valves and Fittings assure safety and economy in any plant.

Vogt

DROP FORGED STEEL VALVES & FITTINGS

NEW YORK
CHICAGO
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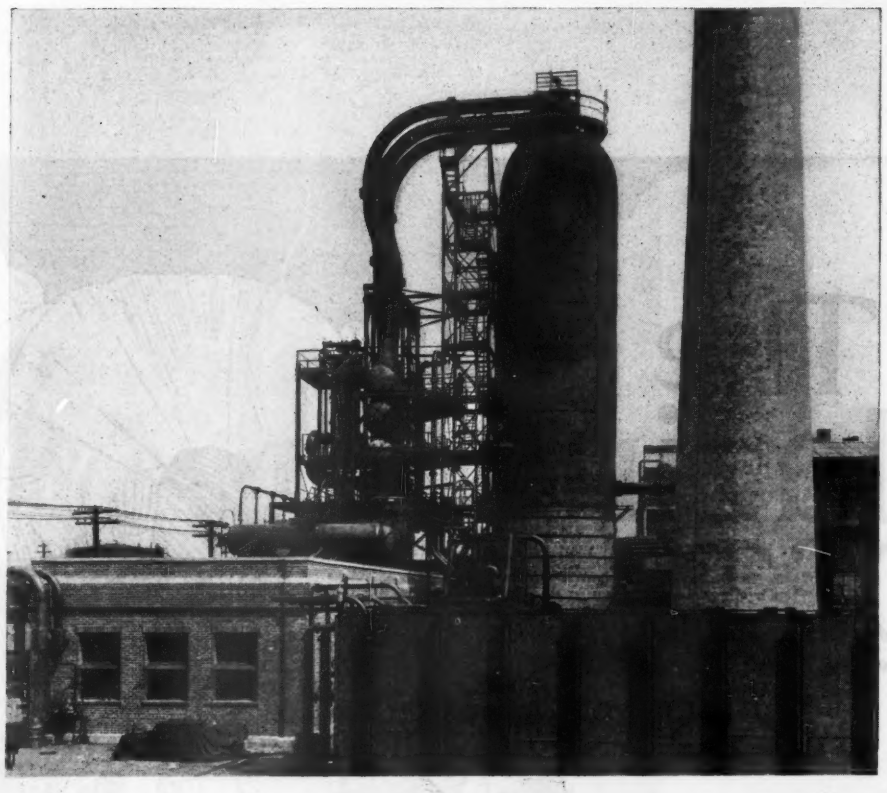
HENRY VOGT MACHINE CO.
INCORPORATED
LOUISVILLE, KY.

Manufacturers of: Oil Refinery Equipment, Drop Forged Steel Valves and Fittings, Water Tube and Horizontal Return Tubular Boilers, Ice Making and Refrigerating Machinery.



COMPLETE VACUUM DISTILLING UNITS

A portion of a complete Foster Wheeler refining unit for reduced crudes, is shown above. The fractionating tower, one of the largest in the world, is 18 ft. 6 in. inside diameter, 79 ft. 8 in. high, of riveted steel construction and designed to operate at an absolute pressure of 50 m.m.

The pump house is located at the left, with Wheeler heat exchangers shown above it. The Foster tube still is seen behind the radial brick chimney. An air preheater placed in the gas passage between the still and stack, preheats the air for combustion, giving more efficient overall operation of the still.

The tube still receives 6250 barrels per day of topped Mid-Continent crude and reduces it to 6-7 per cent bottoms. Overhead from the fractionating tower is gas oil, with side streams of pressable paraffin distillate, heavy paraffin distillate, overhead cylinder stock and asphalt bottoms.

FOSTER WHEELER CORPORATION
165 Broadway, New York, N. Y.
Branches in Principal Oil Centers

Foreign Associates:
Societe Anonyme Foster Wheeler; Paris, France.
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FOSTER WHEELER

Strongest Rotary CHAINS yet Developed

THESE Double Excess (XXS) chains (with excess strength and durability doubled) are made throughout of chrome nickel steel and heat treated, even the cotter pins. The bushings and pins are press fitted into the side bars.

The alloy steels and heat treatment assure greatest strength and wear values. The press fits increase durability and prevent wracking of parts.

Send for particulars on these new Howe Chains.

For Sale by Republic Supply Co.

HOWE CHAIN COMPANY, MUSKEGON, MICH.

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Sold by

Republic Supply Company

GENERAL OFFICES - HOUSTON, TEXAS

OIL AND GAS WELL SUPPLIES

ROTARY AND CABLE TOOLS

Accuracy of Orifice Measurement *established* 4163 Years Ago

TABLETS of stone, previous to 2234 B.C., tell how Chaldean astronomers used the ORIFICE principle so accurately that their computations of the synodic and periodic months fell short of our modern time by *less than five seconds.*

The Chaldeans' method was simple. By comparing the quantity of water discharged through an *orifice* during the time occupied by the sun crossing the horizon the morning of the equinox, with the amount discharged through the same *orifice* at the next sunrise, they discovered that the amount discharged between the two risings of the sun was 720 times the amount discharged during sunrise on the equinoctial morning. They thus inferred that the sun's orbit measured 720 times its disc, and from that they derived a unit to measure space and *time.* Today, 1929 A. D., Metric *Orifice* Meters set the standard of accuracy in oil and gas measuring. Use of the time-honored *orifice* principle alone is not the reason; 38 years of meter-making experience, good materials, expert workmanship, and always-available service from the largest manufacturer of orifice type meters insure dependable, economical measuring. *Write for Bulletin No. E-2.*

METRIC orifice METERS

METRIC METAL WORKS
of the American Meter Company—Inc.
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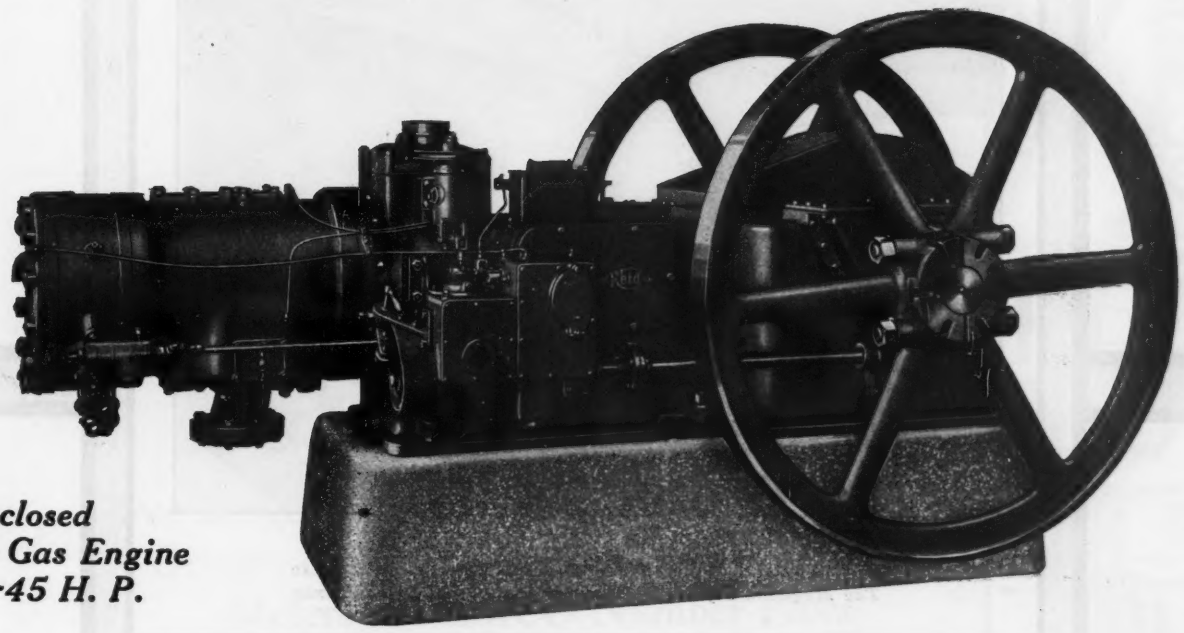
REID



Type C Enclosed
Two Cycle Gas Engine
40 H. P.—45 H. P.

With Pressure Oiling System— A New Reid Feature

A pressure oiling system, which is supplementary to the splash system, has been designed for the Type C Two Cycle Gas Engine.

The pressure system delivers oil under pressure to the main bearings, crank pin, and cross-head pin. The oil being forced between the bearing surfaces insures perfect lubrication and prolongs the life of the bearings.

The use of the pressure system allows heavier loads to be carried over longer limits of time, and permits overloads on the reciprocating parts that could not be carried safely with splash oiling alone.

Ask any representative or at any branch or agency for the complete details of this oiling system.

JOSEPH REID GAS ENGINE COMPANY
OIL CITY, PENNSYLVANIA, U. S. A.

BRANCHES:

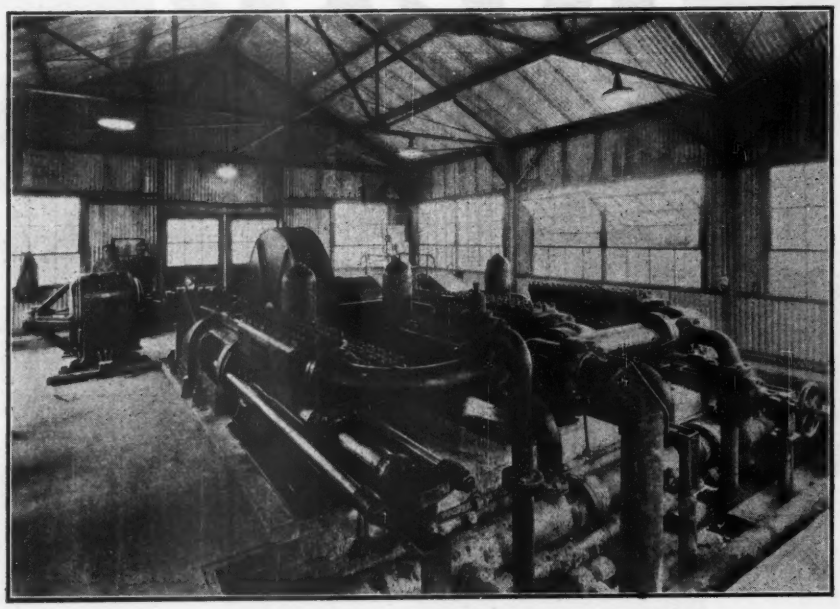
Marietta, Newark, and Logan, Ohio; Charleston, W. Va.; S. R. Shoup, 724 Board of Trade Building, Los Angeles, California.

EXPORT SALES REPRESENTATIVE—Oilfield Equipment Co., Inc., 30 Church Street, New York City.

DISTRIBUTORS:

Frick-Reid Supply Corp., Pittsburgh, Pa., and Tulsa, Oklahoma, Distributors for Bradford and Pittsburgh, Pa., Kentucky, Oklahoma, Kansas, Texas, Arkansas, Louisiana and Wyoming; R. B. Moore, Bolivar, N. Y.; distributed in California by The Republic Supply Co. of California, office address, 2122 East Seventh St., Los Angeles, Calif.

OIL FIELD MACHINERY



A 30,000-bbl. Prescott Menominee electric driven unit in The Magnolia Pipe Line Company's station at Cisco, Texas.

THE MAN ON THE JOB prefers Prescott Menominee Pumps

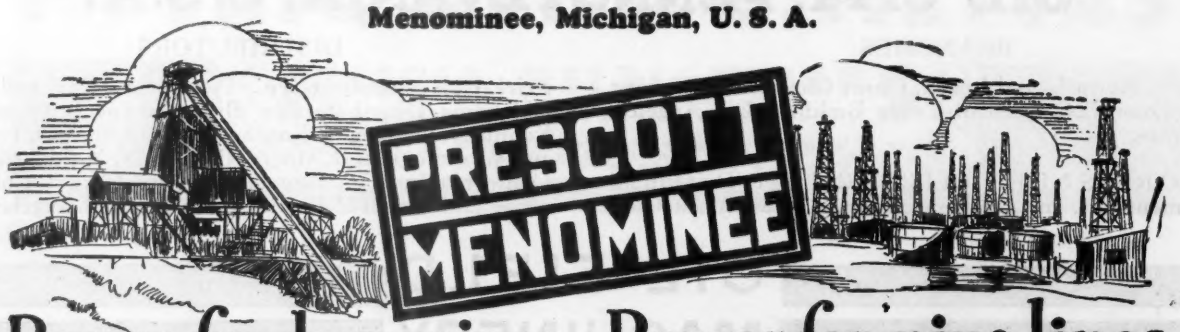
EXPERIENCED pipe line engineers prefer Prescott pumps because of their remarkable dependability, low power requirements, and almost negligible maintenance. These men know the necessity for keeping the oil moving. Shut-downs mean losses and disruption all along the line, so they insist on Prescotts.

Prescott Menominee pumps are built with the strength and simplicity needed for pipe line service. They are plunger type pumps and consistently maintain high efficiencies.

Performance records will show you why the men who know pumps choose Prescotts.

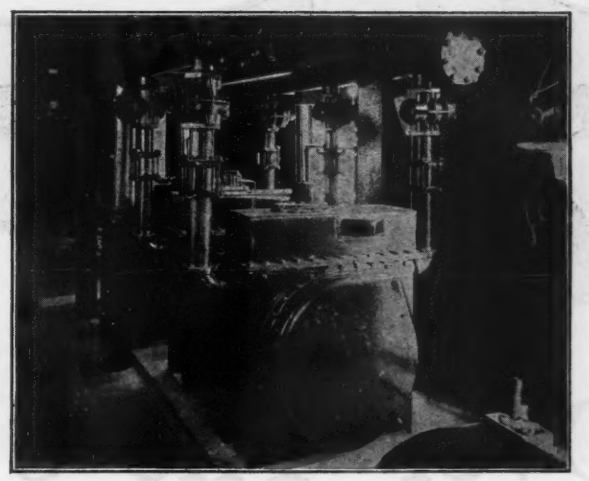
The Prescott Company

Menominee, Michigan, U. S. A.



Pumps for deep mines ~ Pumps for pipe lines

O&GJ 10-10 Gray



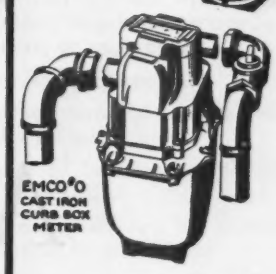
Three Large Capacity Meters Occupy a Small Space When the Meters are EMCO Number Fives

THIS meter requires slightly over four square feet of floor space. The pressed steel construction makes it rigid and is protection against hard jolts or knocks. The EMCO Number Five has a capacity of 10,000 cu. ft. per hour with a pressure drop of less than two inches.

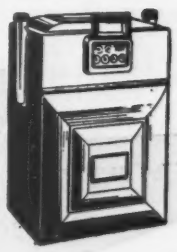
EMCO, *wherever you go.* This installation is in Iowa.

EMCO #0 CAST IRON DRY GAS METER

IRONCLAD CAST IRON DRY GAS METER

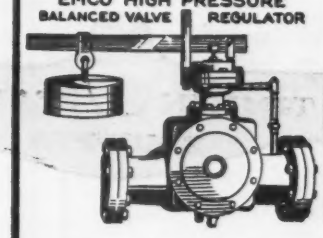


EMCO #0 CAST IRON CURB BOX METER

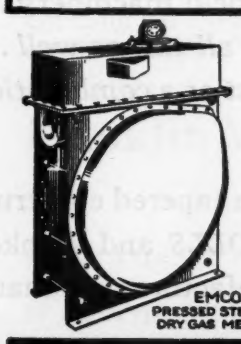


EMCO TIN METER

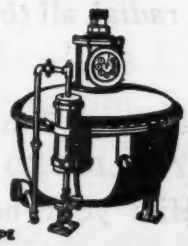
EMCO HIGH PRESSURE BALANCED VALVE REGULATOR



EMCO WATER HEATER AND GAS APPLIANCE REGULATOR



EMCO #5 PRESSED STEEL TYPE DRY GAS METER

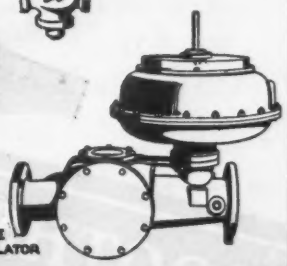


WESTINGHOUSE FLUID POSITIVE GAS METER

EMCO LARGE CAPACITY CAST CASE DRY GAS METER WITH EMCO COMBINED RECORD GAUGE

EMCO ORIFICE GAS METER

EMCO DOMESTIC SERVICE REGULATOR



EMCO LOW PRESSURE BALANCED VALVE REGULATOR

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS
TULSA SEATTLE KANSAS CITY SALT LAKE CITY

All Over The Show!

As you circulate among the exhibits at the Sixth International Petroleum Exposition and Congress, make it a point to observe how much of the equipment on display bears the label "Timken Bearing Equipped".

You will see it all over the show. Manufacturers and users of oil field equipment know that Timken is beyond doubt the only bearing rugged enough to withstand the grief and punishment of this unusually severe service.

Oil men know what Timkens do, and they naturally want the superior service, the savings and the extended machine life that go with "Timken-Equipped".

Timkens predominate in all types of oil field machinery . . . for Timken is *the one bearing that does all things well* . . . whether the loads are all *radial,* all *thrust or a combination of both.*

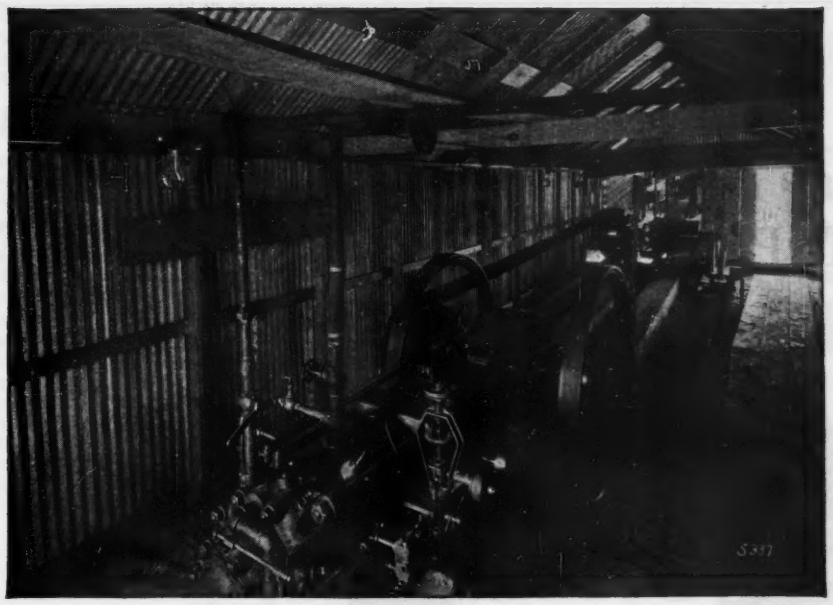
And the exclusive combination of Timken tapered construction, Timken *POSITIVELY ALIGNED ROLLS* and Timken steel makes Timken benefits your benefactors for many extra years of service.

THE TIMKEN ROLLER BEARING CO., CANTON, O.

TIMKEN *Tapered Roller* **BEARINGS**

Booths 72-73 Texas Bldg.
Sixth International Petroleum Exposition & Congress
Tulsa, Oklahoma, Oct. 5th-12th

Franklin Valveless Oil and Gas Engines



Facts Are the Yard Stick of Value

After all it isn't talk but actual facts that tell you how good a drilling engine is—here are some facts—

J. R. Robertson of Wichita, Kansas, owns and operates two new OF 80 HP Oil Drilling Engines and two BG Clutches.

The engine shown is on its second location at Creson No. 1—¾ of a mile north of Valley Center. On this engine's first well they set 255 ft. of 15″ pipe, 1370 ft. of 12″ pipe, 2433 ft. of 10″ pipe, 2700 ft. of 8″ pipe and 3200 ft. of 6″ pipe, completing the well at 3466 ft. The well was started Feb. 3rd and finished Apr. 12th—actual drilling time not recorded. The fuel used was distillate 38-40 gravity. The average consumption was 35 gals. per 24 hours. At present Robertson's two engines are handling 9-inch bailers 60 ft. long in 10-inch holes.

Robertson says in a letter to us—"We have found this equipment to be very satisfactory for cable tool drilling, easy on belts and wire lines, also very economical on fuel and lubricating oils. Up to the present time we haven't spent a single penny for repairs on these outfits."

Franklin Valveless Engine Company
Franklin, Penna.

PRICES

40 HP Type OF Franklin, including water circulating pump and pulley. *$1550 F.O.B. Franklin*

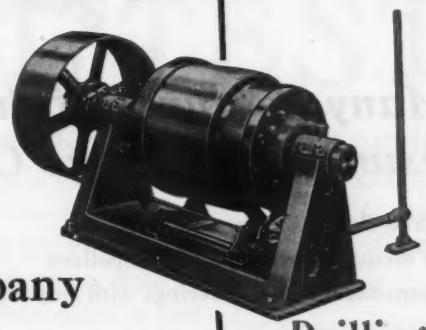
50 HP Type OF Franklin, including water circulating pump and pulley. *$2050 F.O.B. Franklin*

80 HP Type OF Franklin, including water circulating pump, pulley and air starting equipment. *$3200 F.O.B. Franklin*

NOTE—Type OF is readily converted into type OG for gas fuelization.

Some of the Franklin OF Good Points

- Enclosed type
- Low fuel consumption
- 100% interchangeability
- Simplicity
- Piston rod is fitted with metallic packing which never needs adjusting or replacing
- Every spring exposed
- Complete simplicity with practically no adjustment
- In case of belt breakage engine automatically stops
- Fuel pump driven by eccentric running in oil bath
- Bearings are removable and reversible
- Only standard threads used. No special wrenches required
- Cylinder has 3 point, force feed lubrication
- Balance of lubrication is splash feed
- Pistons are air cooled
- All nuts subject to vibration are castillated and fastened with cotter pins
- Most economical to operate in fuel, lubricant, water and repairs
- Easy to start



Type BG Clutch for Cable Tool Drilling or Pumping

- A vast improvement over the former type of clutches.
- Driven from pulley on engine. Permits the use of a larger diameter pulley and makes possible a slower clutch speed. Operates by hand lever on derrick.
- Construction and design prevent Reverse Clutch Troubles.

PRICE—$1200.00 F.O.B. Franklin, Penna.

Distributed by

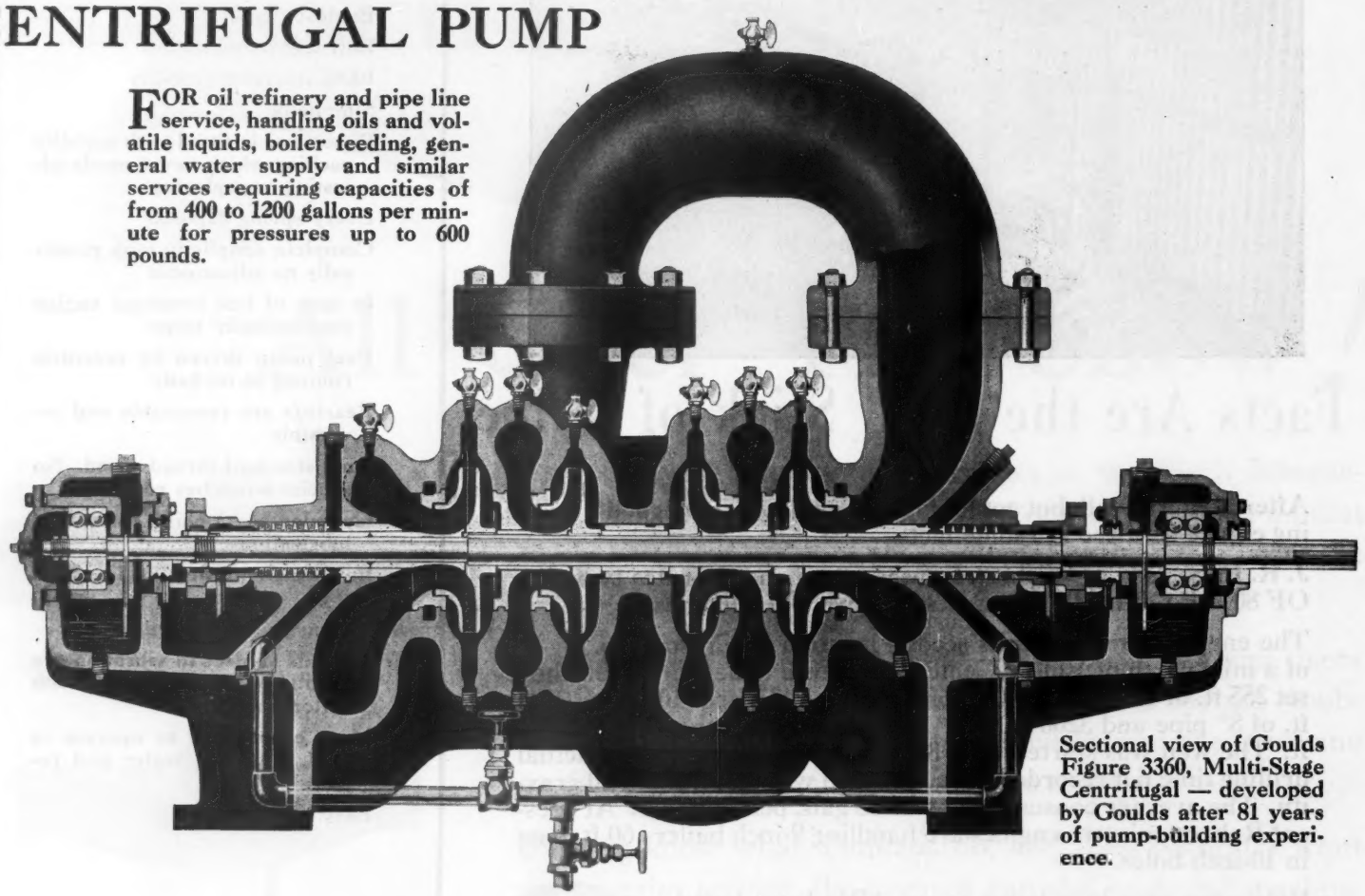
OIL WELL SUPPLY COMPANY

Branches in All Oil Fields

GOULDS

High Pressure Multi-Stage CENTRIFUGAL PUMP

FOR oil refinery and pipe line service, handling oils and volatile liquids, boiler feeding, general water supply and similar services requiring capacities of from 400 to 1200 gallons per minute for pressures up to 600 pounds.



Sectional view of Goulds Figure 3360, Multi-Stage Centrifugal — developed by Goulds after 81 years of pump-building experience.

Some of the Many Features of the Goulds High Pressure Multi-Stage Centrifugal Pump

High efficiency mixed flow type impellers.

Elimination of end thrust through opposed impellers.

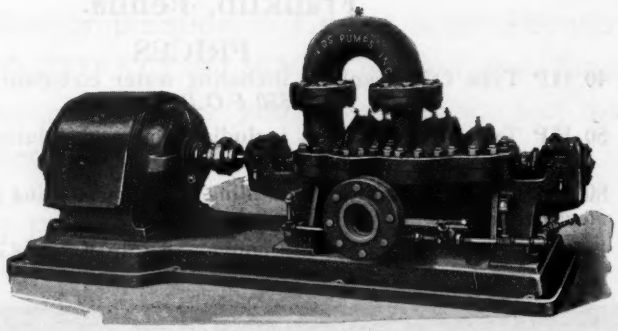
Double row maximum capacity ball bearings with ring lubrication.

Elimination of stuffing box troubles through use of double guided glands — a new development in centrifugal pump practice.

Control of stuffing box pressures through exterior piping and valves.

Shaft and casing protected at all points by renewable sleeves and bushings.

Sound engineering design and expert workmanship throughout insure high, maintained efficiency, low operating costs and trouble-free operation.



Representatives of Goulds Pumps, Inc., are located in nearly every city. Call on the representative nearest you for prompt assistance in solving any of your pumping problems.

Let us send you our new folder containing full information on this pump.

GOULDS PUMPS, Inc., Seneca Falls, New York

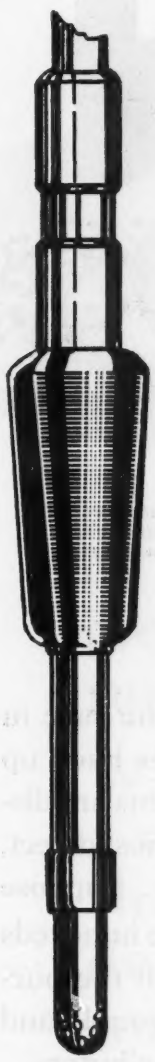
Branches:

*Boston, 194 Congress St.
*Chicago, 12-14 So. Clinton St.
Houston, 1902 Second National Bank Bldg.
*New York, 16 Murray St. 19 Park Pl.
Pittsburgh, 636 Henry W. Oliver Bldg.
Tulsa, 705 Kennedy Bldg.
*Philadelphia, 111 North Third St.
Atlanta, Citizens and Southern Bank Building
Cleveland, Union Trust Building

**Branch Warehouses*

Representatives in all principal cities.

Eliminate Uncertainty in Rotary Drilling



By catching samples of the actual fluid from any formation encountered. That "saturated core" may not produce. That casing-seat may have a water stratum below it. Why not know about this before setting casing? The G. & M. Tester quickly gives you this information. IT COSTS SO LITTLE and frequently SAVES SO MUCH. Furthermore, when you abandon a well as dry, you can KNOW POSITIVELY that you have passed up nothing.

G&M WELL TESTER

Booth 19 in the Arcade Building

"A REAL CONTRIBUTION TO ROTARY EQUIPMENT." A strongly built tool—simple in construction—automatic in operation—positive in its action—safe to run—adaptable to the various size holes—adjustable packer in both length and diameter—the fluid can be circulated when desired—easy to remove from hole after a test because of FLUID EQUALIZING BY-PASS. In fact, every problem in drill-stem testing is successfully solved. Why not let us have your business? WE GUARANTEE A SUCCESSFUL TEST OR NO PAY.

The G&M Company Inc

802-4 MARVIN BLDG.

DALLAS, TEXAS

MAIL THIS COUPON

THE G & M COMPANY, Inc.,
802-4 Marvin Bldg.,
Dallas, Texas.

We are interested in your Tester.

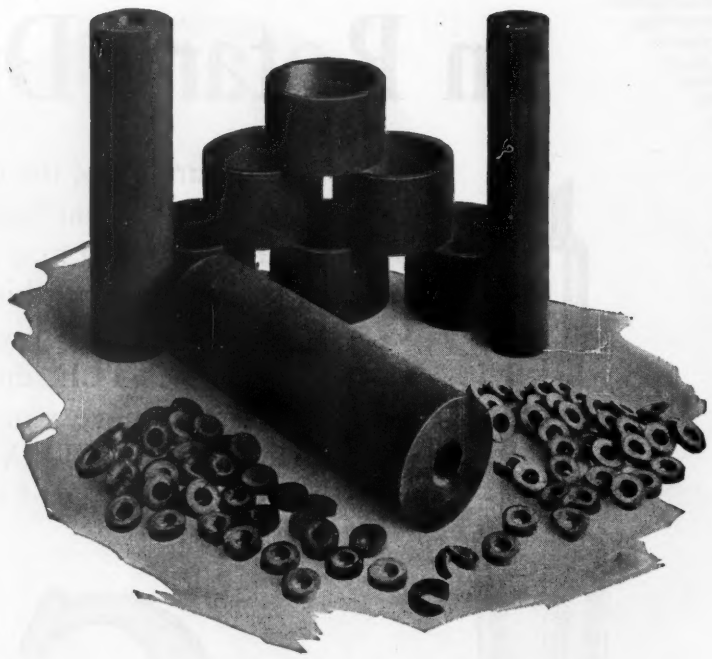
( ) Mail Us Literature.
( ) Have Your Representative Call.

Name _____

Firm Name _____

Address _____

Swabs . .
Packers . .
Rings



Republic's long experience in the oil fields explains the superior quality of any Republic molded or lathe cut item.

RESEARCH in the field and in the laboratory, infinite care in production and the use of only the best materials back up every Republic product. Republic mechanical rubber items are distributed through the Industrial Supply Distributor, the most direct, economical and efficient manufacturer's representative. Suppose you had to buy your stock from the manufacturers of the hundreds of products you use, see all their salesmen and record all the purchasing procedure? The distributor saves you all this trouble and expense. For better service and quality use Republic distributors.

THE REPUBLIC RUBBER CO.
Youngstown, Ohio

Belting — Packing — Hose
Molded Goods—Lathe Cut Goods

When you tell a friend that you are sending your son to Yale, no further discussion is necessary.

When you tell an oil man that a well is Halliburton-cemented, the statement carries a similar degree of finality. To the seasoned operator nothing but the safest form of protection is thinkable.

HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma

Specify Oxwelding *Under* Linde Procedure Control

GAS and oil pipe lines require joints that are 100% efficient—as strong as the pipe, tough, ductile, and permanently leakproof. Linde Procedure Control for welding applied to the construction of thousands of miles of Oxwelded lines has assured permanent tightness — minimum leakage losses — and lasting satisfaction in their operation.

Pioneers in Procedure Control for Welding

LINDE OXYGEN
The Linde Air Products Co.

~

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Co., Inc.

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Oxweld
Apparatus and Supplies
Oxweld Acetylene Co.

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UNION CARBIDE
Union Carbide Sales Co.

Units of
UNION CARBIDE AND CARBON CORPORATION

General Offices
30 East 42nd Street, N. Y. C.

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Sales Offices
In principal cities of the country

• 64 Linde Plants—45 Prest-O-Lite Plants—154 Oxygen Warehouse Stocks—138 Acetylene Warehouse Stocks—38 Apparatus Warehouse Stocks—235 Carbide Warehouse Stocks

BITURINE COATINGS

Biturine Enamel Primer *Biturine Solution No. 5*
Biturine Enamel *Biturine 70-30*
Biturine Coupling Mixture

This group represents the fruits of more than 20 years of careful research and practical experience. Biturine Enamel and Primer are particularly adapted to the Hill, Hubbell & Company process of mechanically applying protective coating to the pipe at the mill.

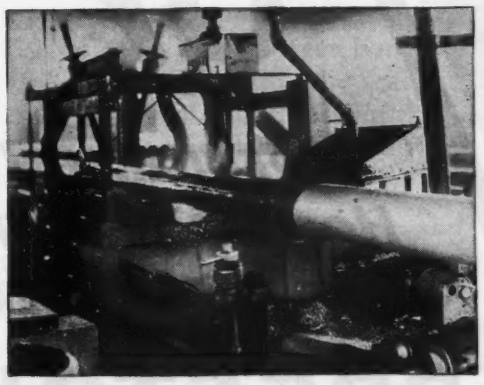
Mechanically coated and wrapped pipe. The newest development in pipe line protection

Now you can buy line pipe mechanically coated and wrapped *at the mill*. No longer need the laying of new lines or the renewal of old ones be subject to the hazards and delays caused by the old method of applying the protective coating in the field. Your pipe is delivered to you ready to lay, fully protected by the Hill, Hubbell & Company process of coating the pipe and wrapping it at the mill.

It is generally accepted by authorities that *proper application* of pipe line coating is the most important feature in the success of any form of protection. Field applications under the most ideal conditions have never been productive of a 100% satisfactory job in all cases, owing to the unfavorable conditions under which the work had to be carried on—inclement weather—unskilled labor — varying temperatures — the difficulty of properly cleaning the pipe and applying the coating of the protective material so as to cover the surface thoroughly.

The Hill, Hubbell & Company process of mechanical application at the mill eliminates all these difficulties, and presents the following outstanding advantages:

1. The pipe is thoroughly cleaned of all rust and mill scale.
2. It is not only thoroughly dry but warm when the primer is applied.
3. The required thickness of the protective coating of Bitumen is applied *before* the felt is applied.
4. This thick coating is applied in two coats, insuring freedom from pin holes and bubbles.
5. The coating of felt is applied under tension and is exactly spaced and, therefore, perfect.
6. The whole process is mechanical, involving no human element, and no waste.
7. The entire operation goes on under roof and can proceed night and day regardless of weather.
8. Exact temperature control of the Bitumen is possible. This is important and cannot be had in field operations.



The Coating and Wrapping of the Pipe is a Continuous Mechanical Process

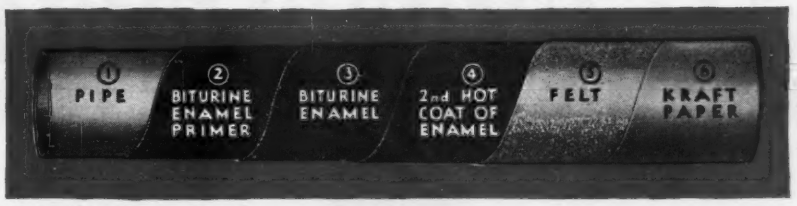
Plants for the mechanical coating and wrapping of pipe are located in the following cities for the production of the pipe manufacturers listed.

CENTRAL TUBE COMPANY, Ambridge, Pennsylvania; SPANG-CHALFANT & COMPANY, Ambridge, Pennsylvania; YOUNGSTOWN SHEET & TUBE COMPANY, Indiana Harbor, Indiana; NATIONAL TUBE COMPANY, Lorain, Ohio; A. O. SMITH CORPORATION, Milwaukee, Wisconsin; YOUNGSTOWN SHEET & TUBE COMPANY, Youngstown, Ohio.

Others are contemplated and will be installed in the near future. Each of these plants is equipped to handle pipe up to 24 inch diameter and to conform to specifications covering a wide range of combinations of materials.

Write to our nearest office for literature descriptive of the process and for details regarding specifications.

GENERAL PAINT CORPORATION
HILL, HUBBELL & COMPANY DIVISION
CHICAGO NEW YORK TULSA HOUSTON SAN FRANCISCO OAKLAND
LOS ANGELES PORTLAND SEATTLE SPOKANE



Hill, Hubbell & Company Machine Coated and Wrapped Pipe is Your Best Insurance Against Corrosion

MISSOURI PORTLAND CEMENT COMPANY
Prestolith
AND REG. U.S. PAT. OFF.
VELO CEMENT
REG. U.S. PAT. OFF.

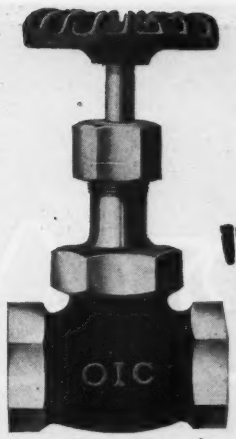
for

DEPENDABLE TWENTY-FOUR HOUR PIPE SETTING AND WATER SHUT-OFF CEMENT

PRESTOLITH
VELO CEMENT

MISSOURI PORTLAND CEMENT CO.
ST. LOUIS KANSAS CITY MEMPHIS

Manufacturers of Red Ring Portland Cement for more than a quarter of a century. Write for complete literature.



"How many things can we do to make these Valves Uncommonly Good Valves"?

MAYBE nobody has ever gone through the O. I. C. Plant asking that question, but the *principle* of it has governed the business for nearly 50 years. Looking at this Brass Union Bonnet Valve (made in Globe and Angle Types) and reading this short discussion, will remind you again of the importance of small details.

The joint between bonnet and body is made so the thread is outside the seat: hence is protected from action of fluids passing through. Valves are easily ground in, without removal from the line.

Materials are carefully selected: a special stem metal of great endurance, and disc of nickel-bronze. Metal for Body, Bonnet and Union Nut is especially adapted to maximum steam pressure, retaining its original tensile strength exceptionally well, even under 300 pounds steam pressure.

Very liberal factor of safety assures service and long life under exacting conditions. Full pipe area at all points; full length pipe threads.

Complete facts on these and other O. I. C. Valves for the Petroleum Industry will be gladly furnished on request to O. I. C. Distributors in leading cities, or directly by

THE OHIO INJECTOR CO., *Wadsworth, Ohio*

These Threads are *Milled—not Die-Cut*

Another important Long-Life Insurance Policy by O. I. C.! This milled spindle thread assures maximum accuracy of lead, concentric with the stem.

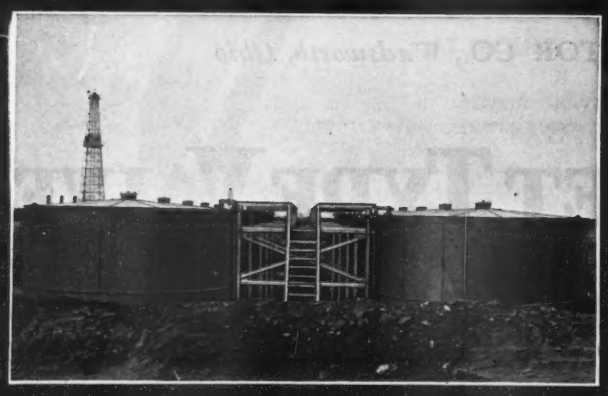
BRASS UNION BONNET TYPE VALVES *made by the* OIC folks *at Wadsworth, Ohio*

OIC

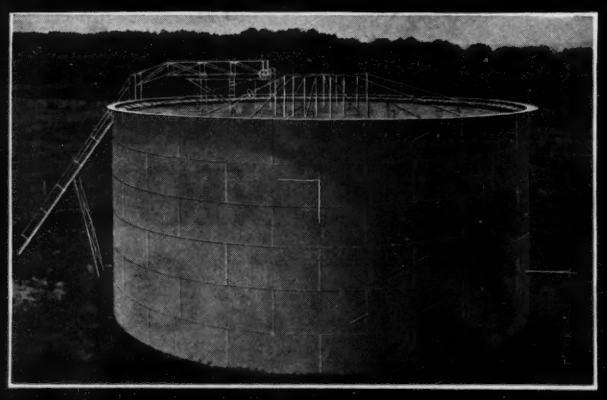
COLUMBIAN

COLUMBIAN STEEL TANK COMPANY
MANUFACTURERS
TANKS FOR THE WORLD
KANSAS CITY MO. U.S.A.

···BOLTED TANKS···

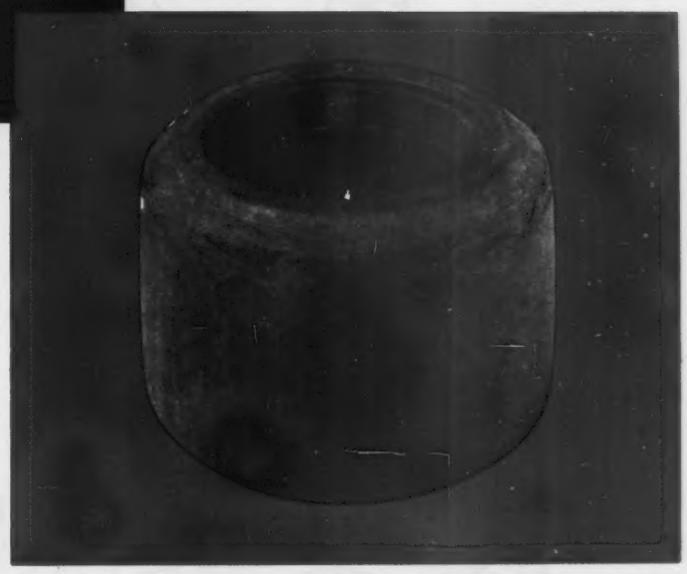


~~FLOATING DECKS~~



NEW
Photo of new Protector ready to be installed on pipe.

USED
Protector used in 6 wells after 5000 hours of actual drilling service.



It's astounding the way Bettis Rubber serves

Now Ready—New Catalog.
Just off the press. Ask for a copy.

Fighting friction, contending with pipe vibration, withstanding all manner of attacks, Bettis Protectors are so tough, so invulnerable—that they actually outlast the pipe. They retain their grip. The extreme toughness and "snap" in the rubber assure permanent adherence to the pipe for its entire life. The tight grip maintained is better comprehended by observing the elastic stretch on a given size. For instance, a 6" Bettis Protector is 4¼" inside diameter before expanding and is expanded to operate on a drill pipe having a diameter of 6⅝". During process of installation it is slipped over a tool joint with 8" diameter. The rubber snaps back to the final 6⅝" size and stays where placed.

More than 200,000 in service.

PATTERSON-BALLAGH CORPORATION
Insurance Exchange Bldg.,
Los Angeles

39 Cortlandt St., New York City

Texas and Gulf Coast Distributors:
Bettis Sales Co., 616 Pub. Nat. Bank Bldg., Houston

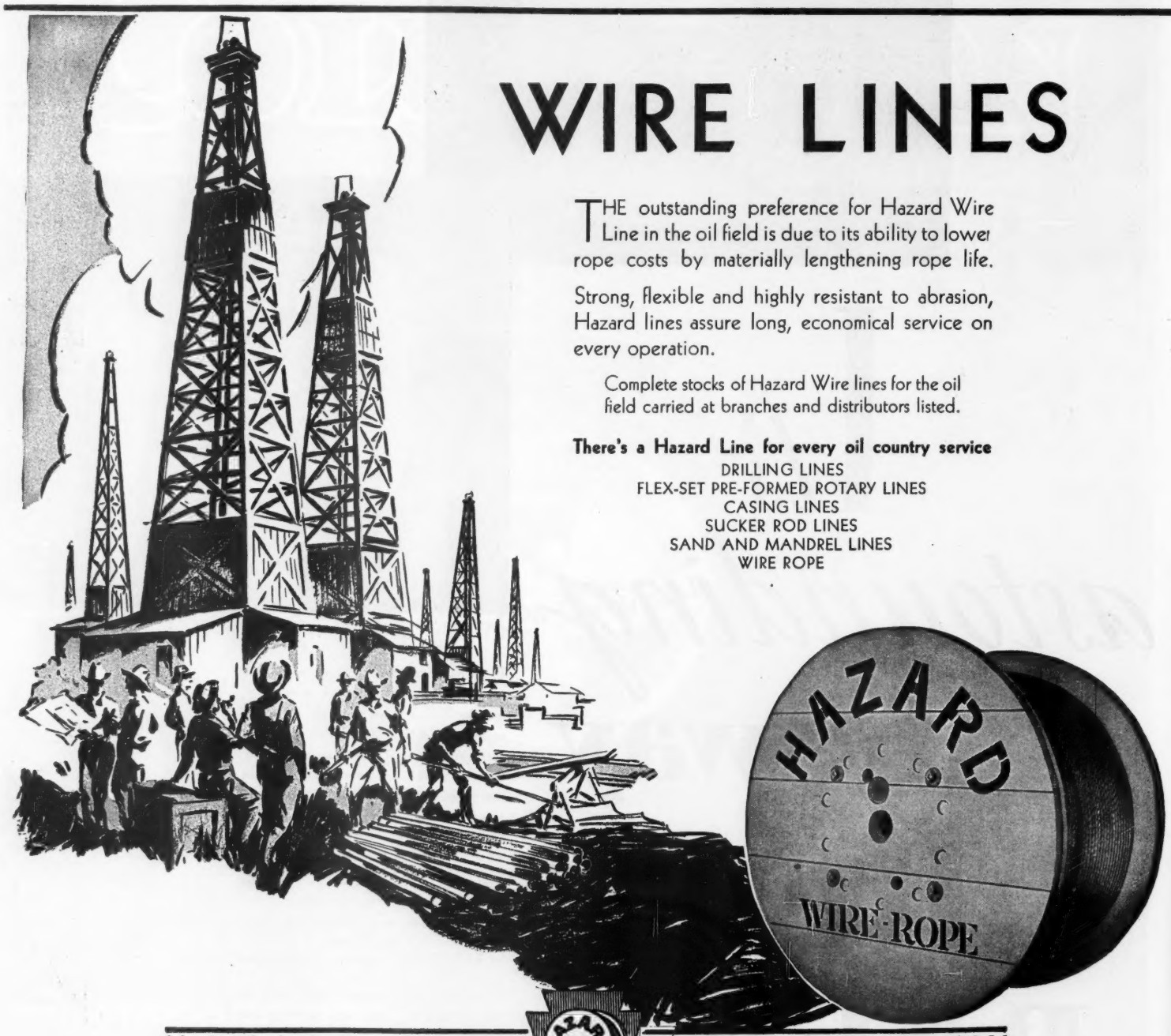
Oklahoma Distributors:
Bailey & Becker Co., 2416 N. Boston Place, Tulsa

Stocks carried in Los Angeles, Santa Fe Springs, Coalinga, Kettleman Hills, Bakersfield, Long Beach, Tulsa, Houston, Wink, Calgary and New York City.

"Best bet yet"

Bettis Protectors

HAZARD



WIRE LINES

THE outstanding preference for Hazard Wire Line in the oil field is due to its ability to lower rope costs by materially lengthening rope life.

Strong, flexible and highly resistant to abrasion, Hazard lines assure long, economical service on every operation.

Complete stocks of Hazard Wire lines for the oil field carried at branches and distributors listed.

There's a Hazard Line for every oil country service

DRILLING LINES
FLEX-SET PRE-FORMED ROTARY LINES
CASING LINES
SUCKER ROD LINES
SAND AND MANDREL LINES
WIRE ROPE

HAZARD WIRE ROPE COMPANY
WILKES-BARRE PENNSYLVANIA

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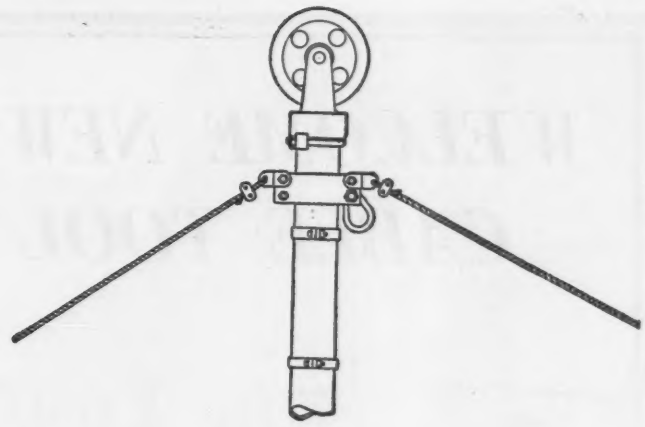
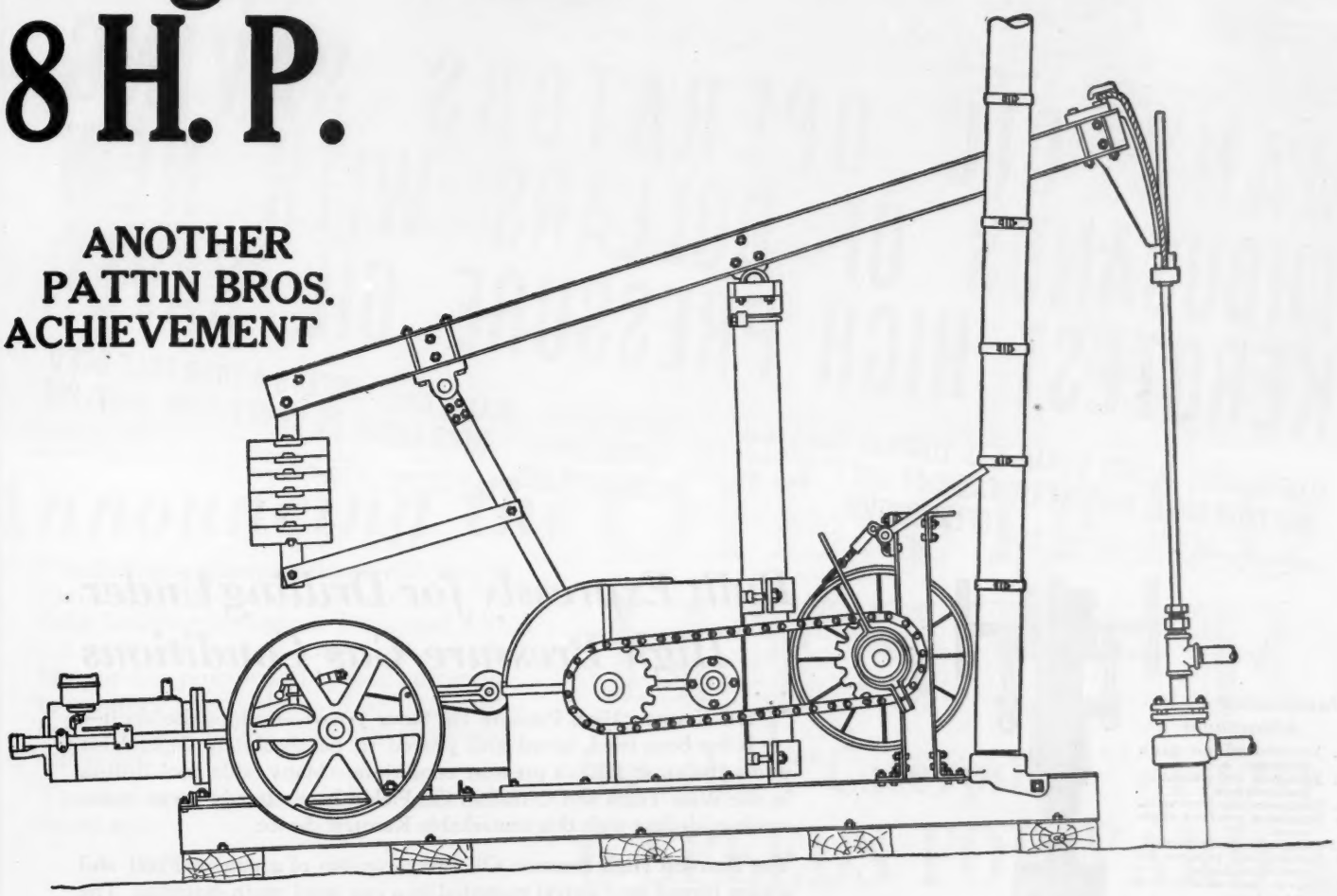
UNITED OIL WELL & SUPPLY CO.
Los Angeles, Cal.

NEW—
Single Well
8 H.P.



ANOTHER PATTIN BROS. ACHIEVEMENT



THIS new Pattin Bros. power is a single well 8 H.P. beam pumping unit belt driven with belt tightener running on roller bearings. All gears are enclosed, running in oil, and every bearing on power, including pitman, has roller bearing.

It has a 36-ft. mast, spool will hold 3,000 ft. ½ inch line; two brake bands 26 inches diameter, 3 inch face, operated by hand or foot clutch on spool. Shaft can be thrown in or out while spool is running. Engine is fitted with force feed lubricator suitable for twenty-four hours run.

Mast and spool are independent of pumping unit and can be moved from one power to another, thereby saving the expense of mast and spool for every power.

We recommend this power for wells 2,500 feet deep. It will pull rods or tubing or handle bailer.

Prices and circular on request.

PATTIN PRODUCTS

- Gas Engines
- Pumping Powers
- Water Pumps
- Air and Gas Compressors
- Vacuum Pumps
- Oil Country Boilers
- Torpedo Reels and Clamps
- Steel Storage Tanks
- High Pressure Tanks
- Howe Casing Heads
- Shackle Irons

THE PATTIN BROS. CO.

THE PATTIN BROS. CO.
MARIETTA, OHIO

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WELCOME NEWS TO CABLE TOOL DRILLERS!

The Lone Star Herald

LATE NEWS
Weather
Fair and Warmer

THREE CENTS

MONDAY, JUNE 17, 1929

VOL. 2—NO. 200

MANY OIL OPERATORS SAVING THOUSANDS OF DOLLARS WITH NEW KEROTEST HIGH PRESSURE OIL SAVER

SLEUTH SAVES MAN FROM MOB
Suspect, in Attack On

ACQUIT WOMAN IN MURDER CASE
Jury Frees Mrs. Barr, Held in Shooting

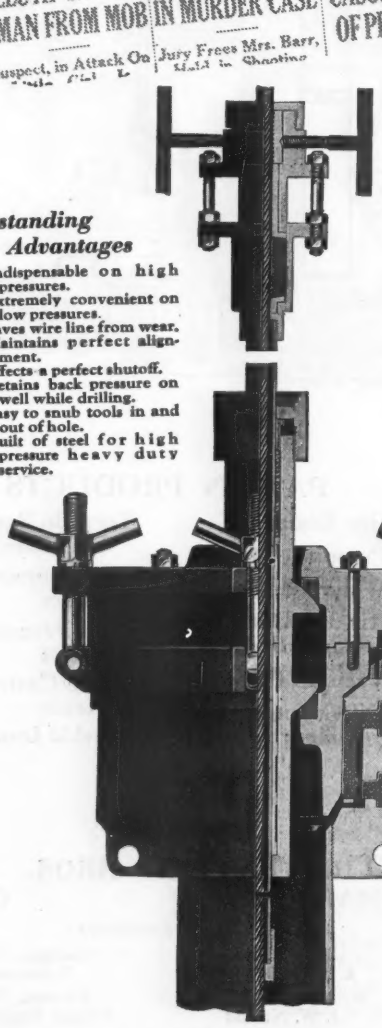
U. S. COMPILES CASUALTY LIST OF PROHIBITION

Demonstrates With Empty Gun, Kills Her Son

THREE KILLED AS WIRE FOULS CANADA PLANE

HEAT CLAIMS THIRD VICTIM
Boy Is Drowned In River Sand Hole

MEETS A LONG FELT NEED IN CABLE TOOL DRILLING



Outstanding Advantages

1. Indispensable on high pressures.
2. Extremely convenient on low pressures.
3. Saves wire line from wear.
4. Maintains perfect alignment.
5. Effects a perfect shutoff.
6. Retains back pressure on well while drilling.
7. Easy to snub tools in and out of hole.
8. Built of steel for high pressure heavy duty service.

Built Expressly for Drilling Under High Pressure Gas Conditions

THE Kerotest High Pressure Oil Saver is new—nothing else like it—It has been tried, tested and proved to be absolutely dependable under the most difficult pressure conditions—Many cable tool drillers in the West Texas and Canadian Oil Fields have already saved thousands of dollars with this remarkable Kerotest device.

The Kerotest High Pressure Oil Saver consists of a patented ball and socket forged steel swivel mounted in a cast steel main housing. The higher the pressure, the greater force is exerted to maintain a tight seat on the swivel joint. In addition, the swivel joint maintains the cable in perfect alignment at all times thus saving wire line from wear.

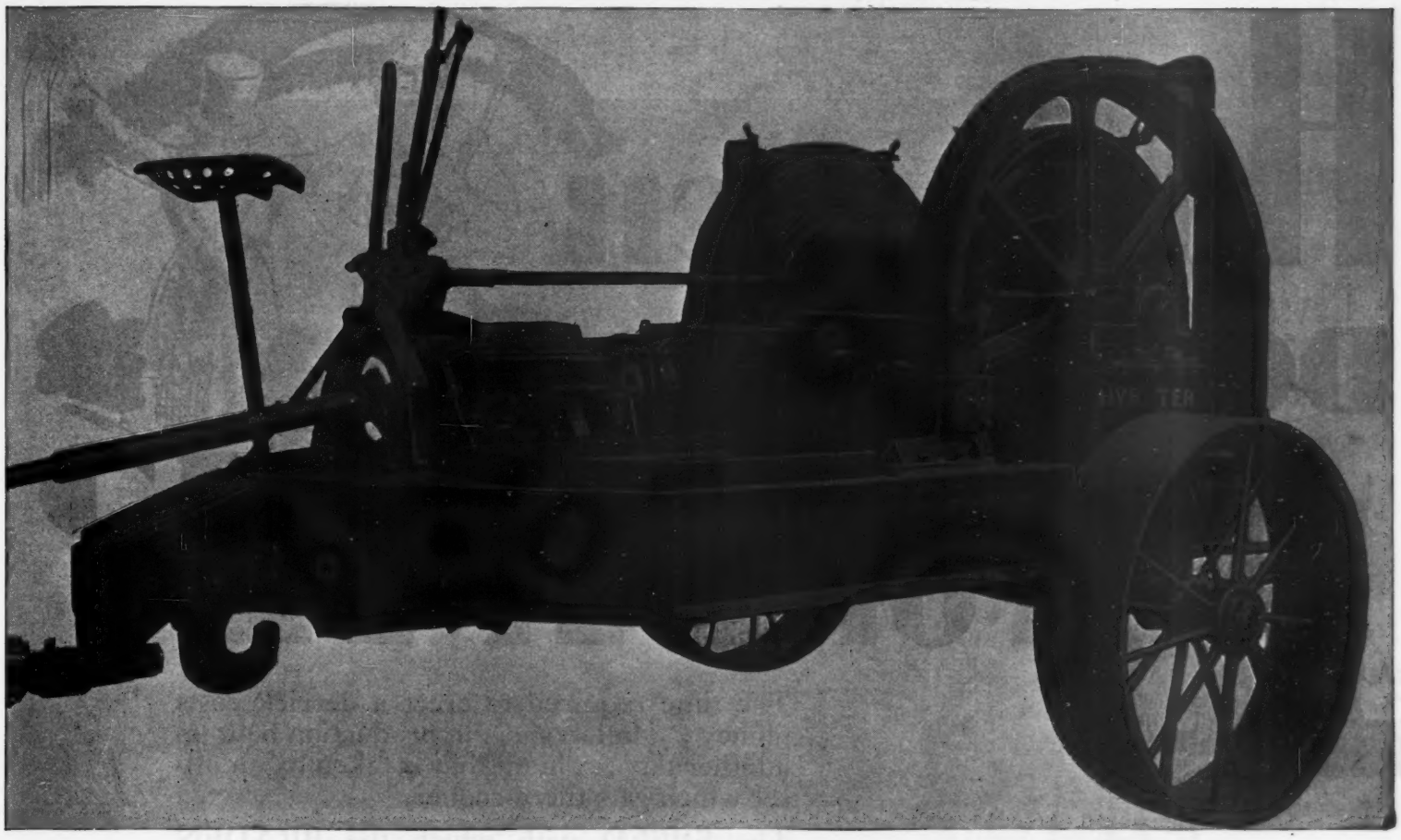
The housing is equipped with a specially designed oil resisting packing ring which permits the well pressure to be actuated behind the rubber packing ring. The result is that any increase in the oil or gas pressure automatically produces a greater pressure on the rubber packing ring.

Investigate the Kerotest High Pressure Oil Saver today—You will find it a boon to economical, efficient cable tool drilling. Descriptive literature sent upon request.

KEROTEST

Kerotest Manufacturing Co.

PITTSBURGH, PENNSYLVANIA



Announcing the OIL FIELD HYSTER

for the "Caterpillar" Thirty

6 SPEEDS FORWARD
2 SPEEDS REVERSE

HYSTER
FOR ANY LIFT OR PULL

Production superintendents will find in the HYSTER the complete answer to their hoisting problems. Designed with six forward and two reverse speeds, Hyster has power and speeds sufficient to conquer every phase of bailing, pulling tubes and sucker rods and swabbing out wells.

The six rated speeds and line pulls forward are:

20,000 lbs. at	54 f.p.m.
10,000 lbs. at	108 f.p.m.
5,000 lbs. at	216 f.p.m.
4,300 lbs. at	250 f.p.m.
2,150 lbs. at	500 f.p.m.
1,100 lbs. at	1,000 f.p.m.

Two reverse speeds 47 and 220 f.p.m.

Numerous hoists for oil field work have been built in, on, and over various makes of tractors, but the HYSTER with the "Caterpillar" Thirty is the only oil field hoist which does not interfere with the use of the tractor for other purposes. It ushers in a new era of power equipment for oil field users.

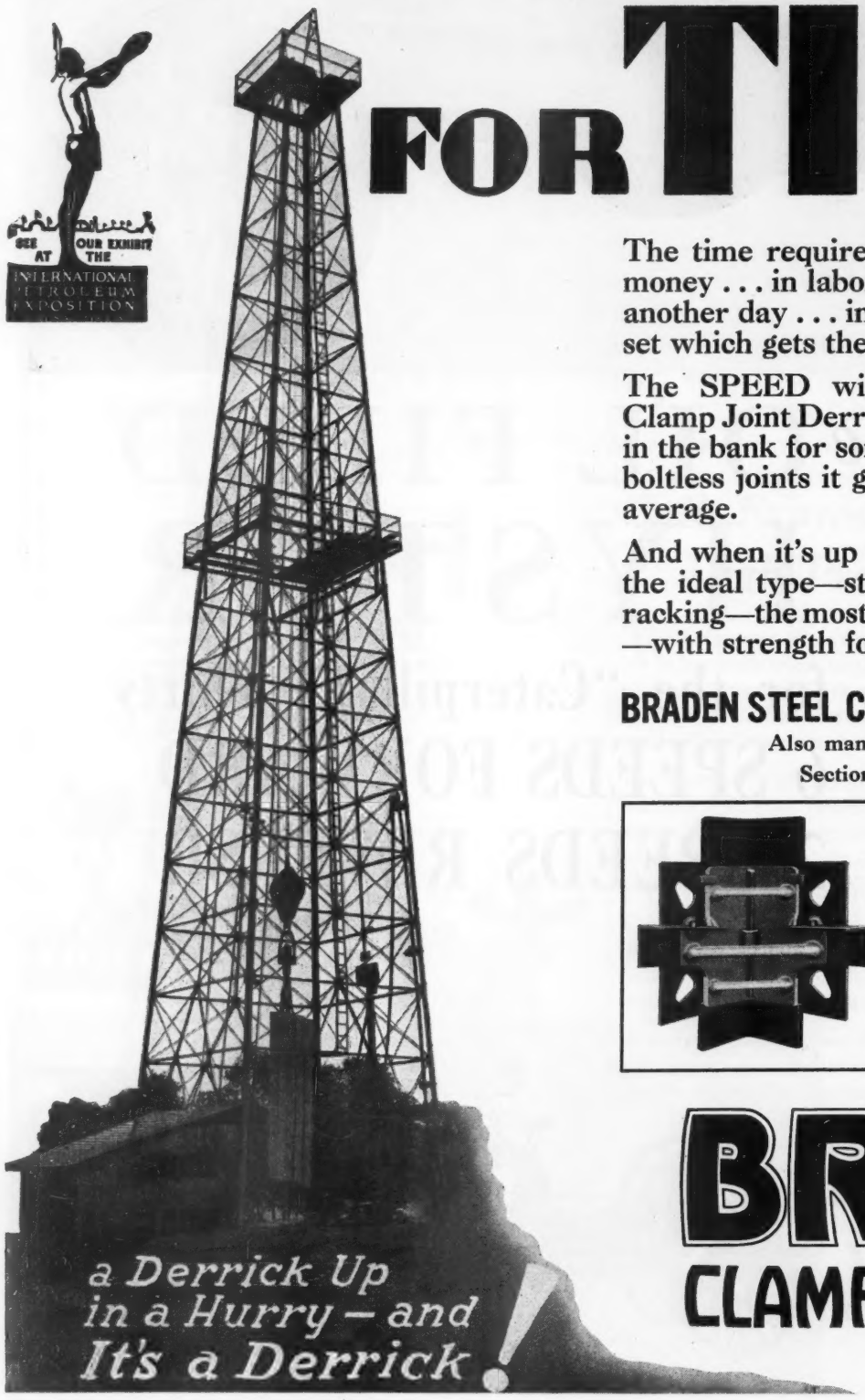
Selling Agents:
Authorized "Caterpillar" Dealers

WILLAMETTE-ERSTED COMPANY

2927

Portland, Oregon . . . Peoria, Illinois

HOW MUCH DO YOU PAY FOR TIME?



The time required to erect a derrick costs money . . . in labor . . . in production held up another day . . . in oil that is taken by an offset which gets there sooner.

The SPEED with which the BRADEN Clamp Joint Derrick is erected means money in the bank for somebody. With its patented boltless joints it goes up a day faster on the average.

And when it's up you have A DERRICK of the ideal type—strung up tight—no play or racking—the most flexible derrick in the field —with strength for every emergency.

BRADEN STEEL CORPORATION, Tulsa, Okla.

Also manufacturers of Braden
Sectional Steel Buildings

DURING THE EXPOSITION

Visit Booths 132-133, Oklahoma Building, to learn how the patented BRADEN CLAMP JOINT makes possible *speedy erection of the derrick without a weakness.*

BRADEN
CLAMP-JOINT DERRICK

A large installation of CP Gas Engine Driven Vertical Gas Compressors in the Seminole Field

ECONOMICAL
in SPACE—in OPERATION

FOR compressor service of all kinds this compact, self-contained, high capacity Diesel or gas engine driven compressor fills every requirement. A large variety of interchangeable cylinder sizes can be supplied, adapting it to widely varying conditions or to work of an experimental nature such as encountered with the flowing of wells by compressed gas.

CP Compressors of this type are available with a capacity range from 49 to 578 cu. ft. per minute and pressures from 60 to 1000 pounds per square inch. Fully illustrated and described in Bulletin 798 sent on request.

Chicago Pneumatic Tool Co.

6 East 44th Street, NEW YORK, N. Y.

Sales and Service Branches all over the World

Whealton & Townsend Co., Inc., *Authorized Distributors*

417 South Hill St., Los Angeles
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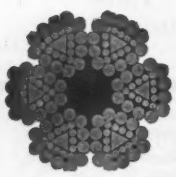
C-290

CHICAGO PNEUMATIC

COMPRESSORS



Patent Flattened Strand

"HERCULES"

RED-STRAND

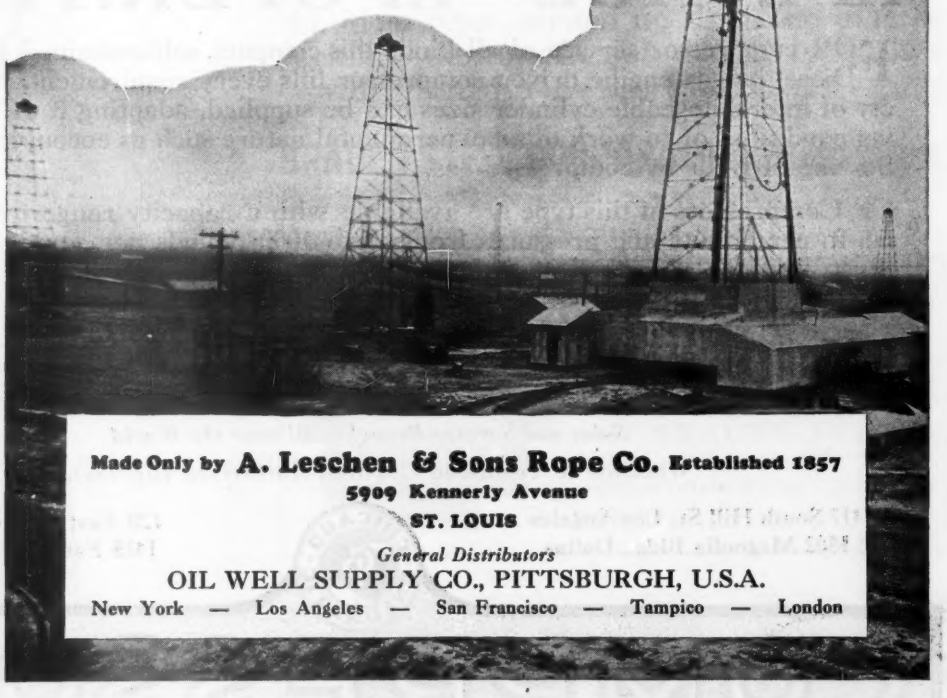
REG. U.S. PAT. OFF.

Rotary Drilling Lines

Results are what count, and Patent Flattened Strand "HERCULES" (Red-Strand) Rotary Lines have actually proved their ability to give extra value.

There are many practical *reasons why these lines are able to "out work" all others, but the real proof is in the field, and we would like to have you give them a chance to show you what they can do.

*A booklet setting forth these reasons will be mailed gladly upon request.



Made Only by **A. Leschen & Sons Rope Co.** Established 1857
5909 Kennerly Avenue
ST. LOUIS

General Distributors
OIL WELL SUPPLY CO., PITTSBURGH, U.S.A.
New York — Los Angeles — San Francisco — Tampico — London

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Oil Conservation Program Is Extended

Highest daily average estimated total production in 1928, week ended Dec. 29, 2,585,844 bbls. Lowest in 1928, May 19, 2,338,241 bbls.

Plan of Mid-Continent Operators to Continue Movement Throughout Year Strengthens Situation in That Area

By Andrew M. Rowley

Highest daily average estimated light oil production in 1928, week ended Dec. 29, 2,158,134 bbls. Lowest in 1928, Mar. 3, 1,927,713 bbls.

Operators in the Mid-Continent area of the country mean business in the matter of conserving crude oil, reducing production to market requirements and in eliminating the necessity of adding further to large quantities of crude in storage. Production figures for Oklahoma during the past few weeks reflect the success already attending these efforts and the present program contemplates a continuance of the movement throughout the remainder of this year at least. The splendid spirit of co-operation displayed by all operators in each of the flush areas of the Mid-Continent territory is reaping its reward as little if any talk is heard any more of a crude price readjustment in the Mid-Continent area while the producers will save considerable money by being able to market their production at once instead of being forced to carry it in storage over a long period.

The 100 per cent shutdown of the Oklahoma City Pool in Oklahoma will end October 12 and production of Oklahoma for the following week will show a substantial increase. It is felt the Oklahoma City Pool can produce from 75,000 to 85,000 barrels daily without difficulty. That pool will be permitted to produce at capacity until November 1 when the new agreement restricting production goes into effect. The new arrangement contemplates curtailment of production in all flush areas of Oklahoma in order to hold production to requirements. Should this plan succeed, and there is no reason to doubt that it will, this will be the first winter in a long time crude was not stored in Oklahoma.

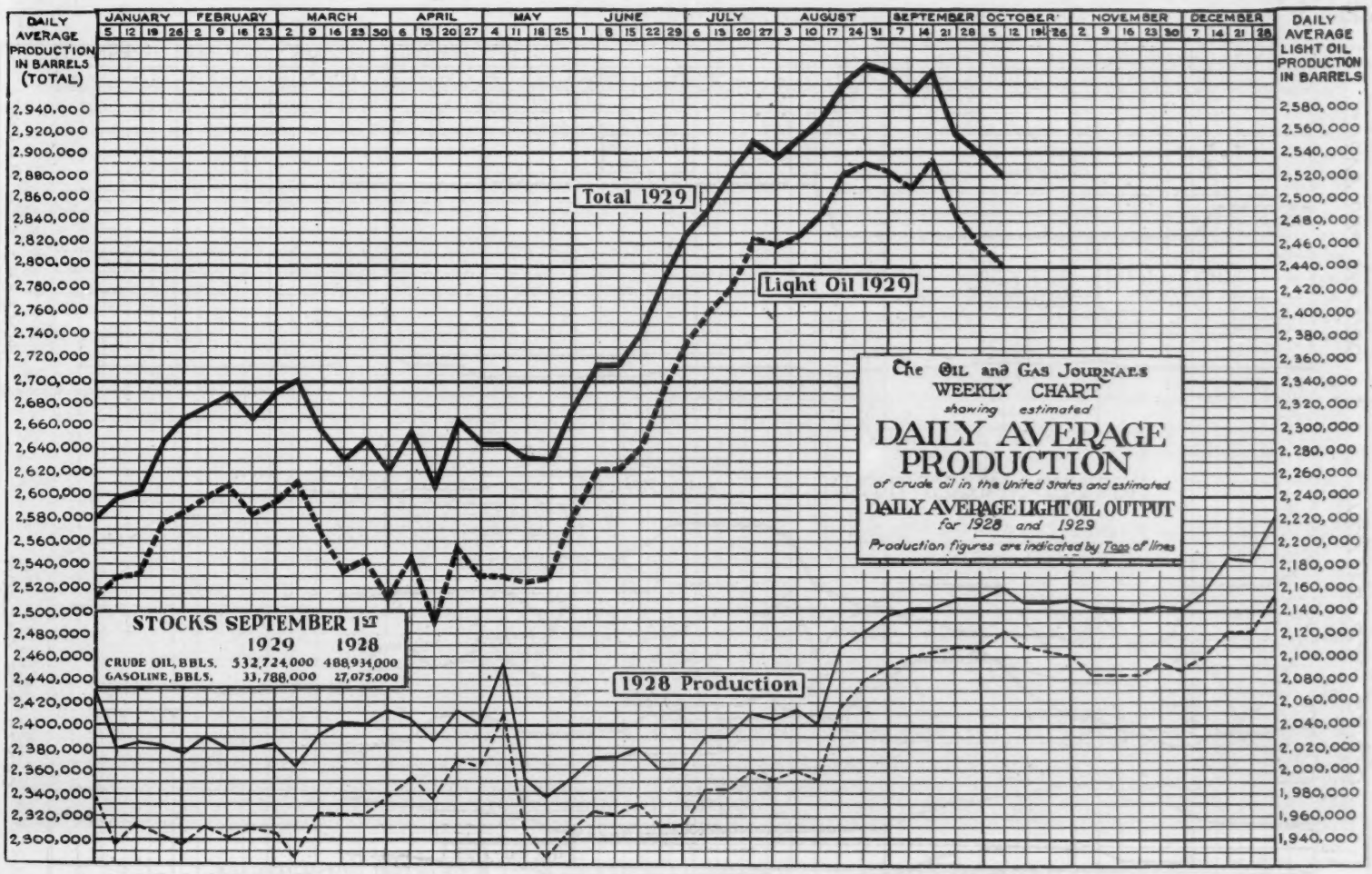
Consequently, the situation in the Mid-Continent continues bright. In California it is somewhat different as smaller operators there threaten further delay and trouble in enforcement of the natural gas conservation law. California hardly can continue much longer piling up its oil stocks and the inevitable then must surely happen in that territory—a price readjustment to compensate purchasers for the cost of carrying oil in storage.

PRODUCTION IN THE UNITED STATES

Estimated daily average production of light and heavy gravity oil in the United States for week ended October 5, and a comparison with the previous week follows:

	Oct. 5		Sept. 28	
	Light	Heavy	Light	Heavy
Oklahoma—				
Oklahoma City	1,035	.....	915	.....
St. Louis-Pearson	60,955	.....	63,470	.....
Seminole	284,220	.....	315,085	.....
Northern Miscellaneous	255,645	.....	251,570	.....
Southern Fields	57,290	.....	58,310	.....
Total Oklahoma	659,145	.....	687,350	.....
West Texas—				
Hendricks	121,174	.....	122,939	.....
Yates	137,400	.....	1[illegible]2 8[illegible]	.....
Remainder	113,389	.....	112,033	.....
Total West Texas	371,972	.....	367,821	.....
North Louisiana	33,070	5,600	33,235	5,620
Arkansas	19,235	45,730	19,125	45,605
North Central Texas	148,708	.....	150,844	.....
Texas Panhandle	116,760	.....	115,748	.....
East Central Texas	17,463	.....	18,191	.....
Kansas	124,345	.....	127,080	.....
Total Mid-Continent Area	1,495,698	51,330	1,519,394	51,225
Gulf Coast	.....	173,224	.....	173,003
Southwest Texas	.....	70,182	.....	72,309
Eastern	135,000	.....	135,000	.....
Rocky Mountain Area	78,107	.....	78,481	.....
California—				
Santa Fe Springs	277,000	.....	275,000	.....
Long Beach	171,000	.....	169,500	.....
Huntington Beach	43,500	.....	43,500	.....
Elwood	22,000	.....	24,000	.....
Ventura Avenue	63,000	.....	62,000	.....
Seal Beach	41,000	.....	41,000	.....
Remainder of State	115,000	147,000	110,250	147,000
Total California	732,500	147,000	725,250	147,000
Total United States	2,441,305	441,736	2,458,125	443,537
Grand Total	2,883,041		2,901,662	

→ **Total Decrease, 18,621 Bbls.; Light Oil Decrease, 16,820 Bbls.** ←



Export Buyers In Oklahoma Market

Purchases Fail to Improve Sluggish Gasoline Situation. Knock Rating Becoming Basis for Premium in Motor Fuels. Fuels Strong.

By C. O. Willson

Sizable purchases of gasoline and kerosene for export movement over the past week in which Oklahoma (Group 3) refiners shared, failed to relieve the sluggish market situation in these two products which in the case of gasoline has been apparent for several weeks. Although many of the larger refiners in the state have not lowered their prices on these products other refiners have made sales for domestic movement from one-fourth to one-half cent under the prices effective the last week in September. These lower prices were for spot shipments and delivery over the month.

Although several buyers and sellers reported both distillate and gas oil more readily obtainable, prices were firm. Fuel oils so far as Oklahoma and Kansas are concerned are tight and prices were again advanced on several grades during the past week. For all grades of fuels ranging from the prime white distillates to the 6 to 12 gravity residual from the cracking stills, the low cold test grades are in greatest demand and generally command a premium over the products of high cold tests.

Other products showed little change over the week. Natural gasolines were easier the latter part of last week but the movement was fair on Monday and Tuesday and prices showed little change. Bright stock, the main product of the lubricating oils plants, continues strong and the few wax makers in the state are optimistic regarding the market situation with predictions of a one-fourth-cent advance before the end of the month.

Export Business

The export business placed during the past week was of interest from several angles. The orders placed in Oklahoma which are said to have totaled approximately 4,000,000 gallons were for 390 and 375 enpoint material. Additional business totaling 3,000,000 gallons was placed with North Texas and Arkansas refineries. The orders were placed at prices substantially under the 7¾-cent quotation which the larger refiners have maintained in their quotations on U. S. Motor gasoline in spot sales to jobbers. This reflects a price situation in which the differential between the high and low gravity grades has been narrowed to the point where sellers are willing to take less than the U. S. Motor price in order to get rid of material in which the supply exceeds the demand.

In this connection one of the significant developments of the past few months has been a change in the buyer attitude as to what constitutes a premium motor fuel. Every refiner and jobber who has been in business a few years can remember the time when high gravity 390 and 375 endpoint gasoline commanded a premium of from 2 to 4 cents a gallon over U. S. Motor gasoline, the usual domestic grade. This differential was exceptionally wide in the winter season when the demand was heaviest in the northern states where the high gravity gasoline was in demand as a premium motor fuel. The situation has rapidly changed over the past two years and it is apparent that during the coming winter the domestic demand for high gravity gasolines will be even less than it was last year.

Two developments are largely responsible for this situation. In the first place many refiners are able to give their customers the quick start and acceleration demanded in the winter motor fuel with-

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REFINED MARKET BAROMETER

Considerable interest was apparent in the probable trend of gasoline prices for export movement. A cargo order at prices substantially under the quotations maintained by the major factors was placed by independent buyers and purchases on the order were made from Mid-Continent refiners. A general revision downward in export prices which have not been changed in several months has been predicted for some time and the developments of the past week indicate that some action will be taken in the near future. The domestic gasoline situation showed little change, reports from most refining areas indicating continued weakness and lower prices whenever any changes were made. Kerosene prices are steady in the Coastal areas with lower prices the rule at interior points. Fuel oils, distillate and gas oil are generally classed as strong except at some Coastal points where competition is strong. The natural gasoline situation was unchanged both in the Mid-Continent and California. The only change reported in lubricating oils was a better demand for bright stocks and some grades of steam refined stocks in the East Coast market. The wax market was more active in all areas.

Mid-Continent—Gasoline prices lower despite substantial export purchases of high gravity grades. Kerosene prices continue downward in Kansas, Oklahoma and North Texas. Distillate and gas oil more freely available with no change in prices. Fuel oils strong. Wax more active. Bright stocks strong.

East Coast—Lubricating oils and wax stronger with higher prices effective on some grades. Gasoline freely offered at prevailing prices. Kerosene domestic demand active and prices steady. Gasoline export market weak and lower prices expected. Fuel oil and Diesel oil unchanged.

Chicago—Heavy gasoline demand but prices continue weak with important price concessions for October shipment. All grades of furnace oil available from sellers and fuel oils also easier to obtain. Kerosene weak.

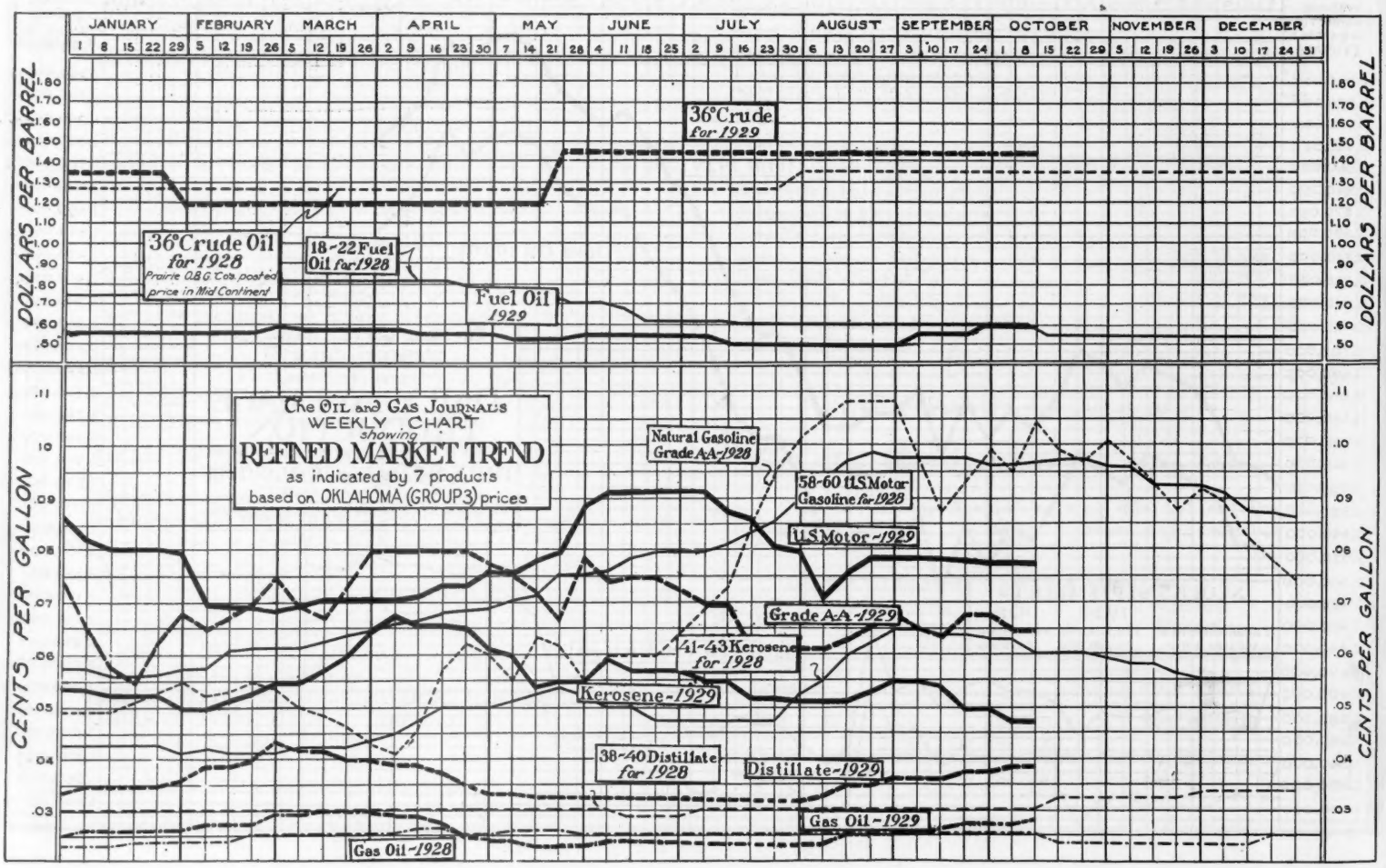
Pennsylvania—Slightly lower prices on some grades of steam refined stocks and bright stocks. Kerosene weak. No improvement in gasoline situation.

Gulf Coast—Market in pale and red oils unsettled. Light movement of fuel oil and gas oil with no change in prices.

MID-CONTINENT REFINERY OPERATIONS
(Data given in thousands of barrels)

	Crude run to stills			Gasoline production			Gasoline stocks†		
	Aug., 1929	July, 1929	Aug., 1928	Aug., 1929	July, 1929	Aug., 1928	Aug., 1929	July, 1929	Aug., 1928
Oklahoma-Kansas	10,318	10,083	10,329	5,549	5,554	5,657	3,257	4,336	1,855
Texas*	5,108	5,275	4,864	1,913	1,901	1,851	957	1,089	603
Louisiana-Arkansas*	2,055	1,963	2,073	727	723	558	314	283	94
Total	17,481	17,321	17,266	8,189	8,178	8,066	4,528	5,708	2,552

*Does not include Gulf Coast. †End of month.



Exposition Crowds Greater Than Ever

All Preceding Exhibits Overshadowed by Sixth Annual Oil Show in Tulsa This Week. Foreign Nations Well Represented

By James McIntyre

The Sixth Annual International Petroleum Exposition and Congress in Tulsa opened on Saturday, October 5, with every one of the more than 800 exhibitors prepared to receive the crowds that will attend the show until the end of the closing day, Saturday, October 12.

So well managed were the preliminary arrangements for the exposition that when the gates opened at 10 o'clock Saturday morning every exhibit was complete and representatives of all the manufacturers and dealers who are a part of the show were in their places.

The greatly enlarged grounds, with their enormous exhibition buildings and wide avenues between the many out-of-door exhibits, presented a brilliant and busy scene Saturday afternoon when the opening ceremonies of the show were staged in front of KVOO broadcasting station in the center of the grounds. The opening ceremonies were sent out on the air so that all America might know that the greatest industrial exposition of the year was in full swing.

On an elevated stage sat William G. Skelly, president of the Skelly Oil Co., and president of the International Petroleum Exposition and Congress; William B. Way, general manager of the exposition; James A. Veasey, vice president and chief counsel for the Carter Oil Co., master of ceremonies; Edwin B. Reeser, president of the Barnsdall Oil Co. and president of the American Petroleum Institute; Mayor Dan W. Patton of Tulsa; Congressman Charles O'Connor, Dr. Luis Calvani, minister of industry of the Republic of Venezuela; Senorita Parades, daughter of Dr. Trinidad Parades, representative of the Mexican government, and Dr. C. W. Kerr, pastor of the First Presbyterian Church of Tulsa. Doctor Kerr is an oil country product. He was born, reared and educated in the Pennsylvania oil regions and his whole life as a minister has been in oil country churches. He was made pastor of the First Presbyterian Church in Tulsa in the early days when his congregation required rubber boots to wade through mud to church, and he has been with it ever since. Doctor Kerr delivered the invocation.

President Skelly, after extending a cordial welcome to the visiting American and foreign oil men, reviewed the progress in invention, engineering and scientific research in the oil industry in the past decade, all of which made a petroleum exposition a necessity so that oil men throughout the world might have one place to go and see displayed the products of the combined brains of the practical and the scientific men engaged in the oil business.

"The exposition this year is singularly important," Mr. Skelly said, "more important than ever before and due to the close association of the oil industry and aviation an air meet is being held simultaneously. To those of you who are listening in I will say that at this moment airplanes contesting in the races arranged are flying over this field. A great number of the planes are participating in the race and more than 300 planes and aviators from all over the country will attend the exposition.

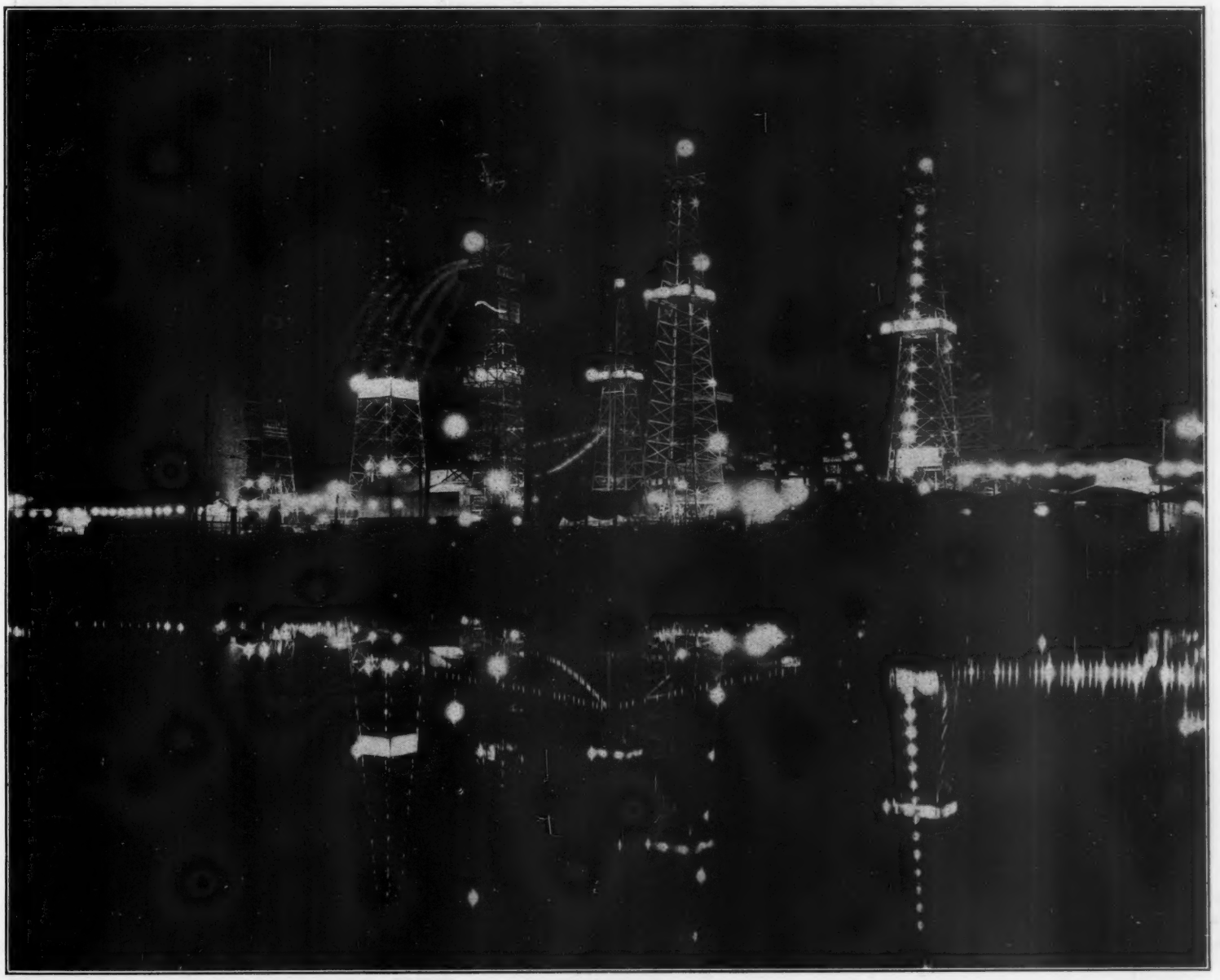
"Tulsa is the natural location for this exposition. It is practically in the geographical center of the United States and is the recognized headquarters for the great Mid-Continent oil field.

"The exposition and congress is attended by tens of thousands of men interested in the industry from all sections of the United States and by hundreds from over sea, who come here to see the most modern development conceived by the leading scientific minds of the world.

"The exposition in conjunction with the congress has brought about good fellowship and better understanding among those engaged in the industry. Problems are here discussed and solved—the benefits of the solutions have been reaped by the entire industry and passed on to the public.

"Each year's exposition brings new inventions and engineering developments that result in added economy and efficiency in every avenue of the business. One of the greatest movements in the industry is standardization. To illustrate recent changes in equipment and methods I want to call your attention briefly to

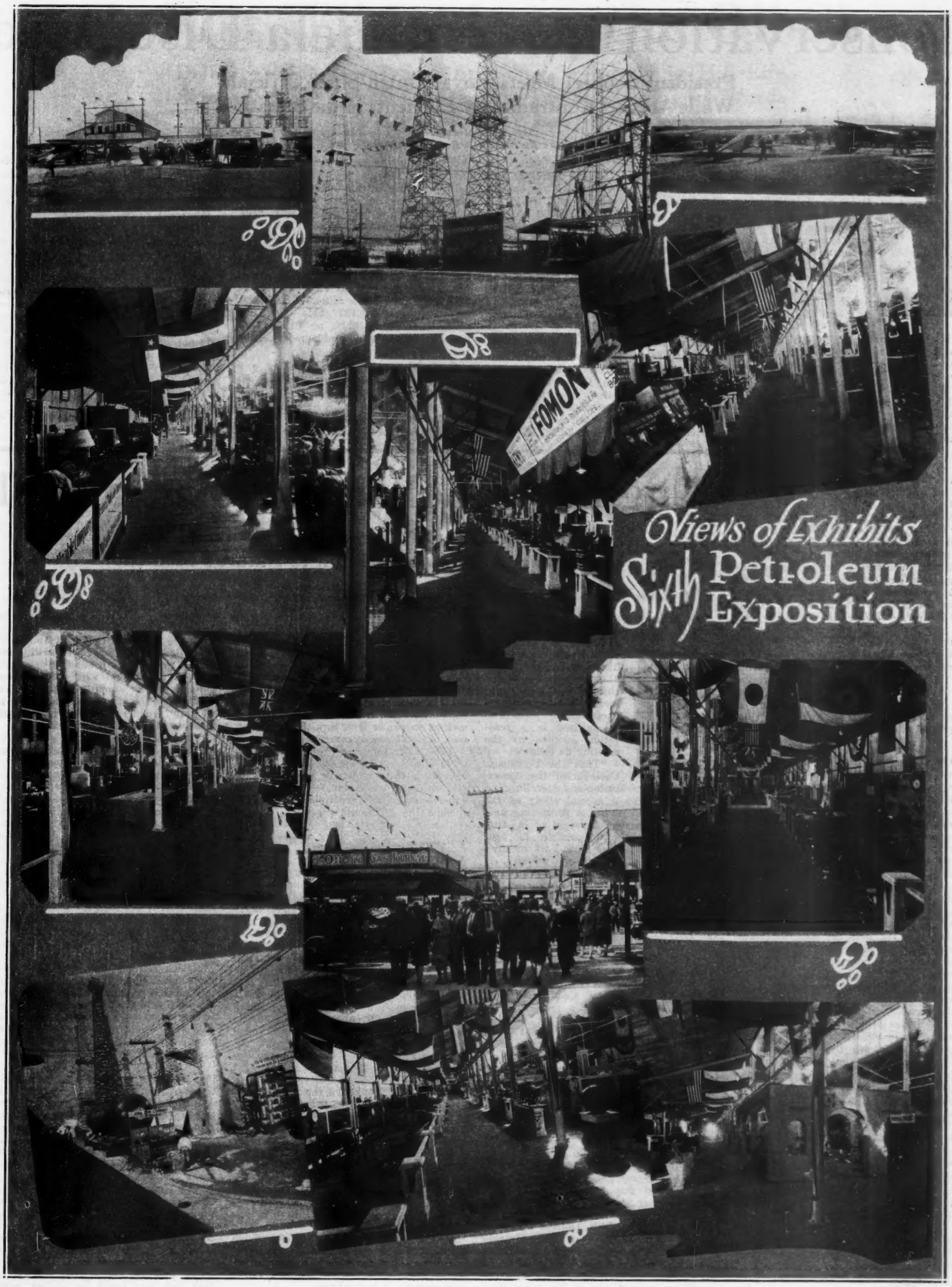
(Continued on Page 227)



—Photo by Ward, Tulsa.

NIGHT VIEW OF SIXTH INTERNATIONAL PETROLEUM EXPOSITION AND CONGRESS

1—William G. Skelly, president of the Exposition, making the opening address. 2—Flag, 110 feet long, unfurled at opening ceremonies. 3—James A. Veasey, master of ceremonies at opening of Exposition. 4—Band and massed colors in front of grand stand. 5—Edwin B. Reeser, president American Petroleum Institute, addressing crowd. 6—Part of crowd in front of grand stand. 7—At one of the derricks. 8—Looking towards grand stand from gates at Twenty-first Street. 9—Sample of opening day crowd.


Views of Exhibits
Sixth Petroleum Exposition
FOMOR
Oil and Gas Journal

Conservation in Venezuela Discussed

President Seubert Meets Royal Dutch-Shell Officials While Abroad. Contradictory Elements in the Situation

By A. E. Mockler
New York Bureau, The Oil and Gas Journal

NEW YORK, Oct. 7.—Possibility of co-operative action between American interests and Royal Dutch-Shell in bringing about closer control of Venezuelan oil production is seen in an announcement here by E. G. Seubert, president of the Standard Oil Co. of Indiana, that this subject had been discussed by him with Royal Dutch officials. Mr. Seubert, accompanied by R. G. Stewart, president of the Pan American Petroleum & Transport Co., has just returned from a European trip.

"We met the Royal Dutch people and held some conversations from which we hope some benefit will result, but no definite agreement was reached," Mr. Seubert stated.

Sir Henri Deterding, managing director of Royal Dutch-Shell, while in the United States last spring, stated he was willing to get together with American operators in Venezuela to effect a conservation movement, and likewise indicated his willingness to enter nto a world accord of this sort. At the time, Standard of Indiana, through Lago Oil & Transport Co., Venezuelan producing subsidiary, was engaged in developing sufficient production to take care of the needs of its new 125,000-bbl. refinery at Aruba, and it was not thought that company was in position to curtail. Now, however, Indiana has evidently reached the point in its Venezuelan operations where it is ready to enter into some accord, and from Sir Henri's previously expressed views, the outlook for some definite action looking toward curtailment in Venezuela is more promising than at any other time since the subject was first broached.

Would Help Situation

Venezuela lends itself ideally to a conservation movement. Acreage is held in extremely large blocks, and a relatively small number of companies dominates the field. Thus, if a practical basis for conservation should be worked out, it would be a relatively simple matter to make it effective. Oil interests here are hoping that some arrangement of the sort will be arrived at, it being felt that the launching of a conservation program in Venezuela would have a material effect on the oil situation in the United States. Leading companies operating in Venezuela, including both the American companies and Royal Dutch-Shell, likewise have important interests in the United States, and it is beginning to be realized that these latter interests are suffering from the continued heavy output of Venezuelan crude, which is being sold in the United States at low prices. A curtailment policy in Venezuela, it is felt, would have a beneficial effect in both directions.

Development of the Venezuelan oil fields has reached the point where the major oil producing areas are pretty well defined, and while it is not contemplated that exploration work should cease, a further shutting in of production in fields already developed would be a logical step. Transportation facilities are now nicely balanced with production in Venezuela, and further expansion in output will require the construction of additional pipe lines, tank farms, and probably ocean tankers for transporting the oil to consuming markets. All of these factors, it can be readily seen, fit in nicely with a conservation movement at this time.

Uneconomic Development

Venezuelan crude production for the first eight months of this year have shown an increase of approximately 40 per cent over that for the corresponding months in 1928, obviously an uneconomic development in view of the world oil situation. A total of 90,268,000 bbls. of crude in round figures, was produced in Venezuela during these months, according to O'Shaughnessy's South American Oil Reports, compared with 65,540,116 bbls. in the corresponding months last year. Daily average output for the first eight months of 1929 was 371,475 bbls., contrasted with 264,508 bbls. in the comparable months of 1928.

Royal Dutch-Shell has continued the dominant factor in Venezuela from the production standpoint. Venezuelan Oil Concessions, Ltd., a Royal Dutch-Shell controlled organization, was the leading producer with a total of 30,823,218 bbls. in the eight months ended August 31, an appreciable gain over the 22,222,223 bbls. produced by the same company in the first eight months last year. Average daily output for this company for the first eight months of the year amounted to 126,845 bbls., against 91,075 bbls. daily in the same months of 1928.

Lago Oil & Transport Co., controlled by Standard Oil Co. of Indiana through Pan American Petroleum & Transport Co., ranks second among Venezuelan producers for the first eight months of 1929 with production of 24,574,826 bbls., an average of 101,131 bbls. per day against 17,189,055 bbls., or 70,447 bbls. per day in the comparable months last year.

Gulf Oil Corp. is third ranking producer in Venezuela, having turned out 20,455,380 bbls. of crude during the first eight months of the year, or 84,178 bbls. daily, compared with 10,847,907 bbls., or 44,458 bbls. per day in the corresponding months in 1928. These totals include royalty oil from Venezuelan Petroleum Corp.

Standard Oil Co. of New Jersey is represented in Venezuela by the Creole Petroleum Corp. Up to the first of January, this year, Gulf Oil Corp. was operating Creole's properties and taking its crude, under contract. Since that date, however, although Gulf continues to operate certain of the Creole properties Standard Oil Co. of New Jersey has been taking the company's crude oil production. Creole produced a total of 4,963,862 bbls. of crude during the first eight months of the year, against 3,493,442 bbls. in the same months last year. This was at the rate of 20,427 bbls. per day, against 14,317 bbls. daily in the same period last year.

Caribbean Petroleum Co., which is un-

(Continued on Page 234)

Engineers Consider Unit Control

W. S. Farish Says Nature Deposited Oil and Gas in Pools and Man Must Submit to Nature's Methods

By L. G. E. Bignell
Petroleum Engineering Editor

The fifth annual meeting of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers held in Tulsa on October 3 and 4 developed into a discussion of ways and means of effecting unit operation of pools and crystallized in a resolution adopted by the meeting as follows:

"That the Petroleum Division of the American Institute of Mining and Metallurgical Engineers make a special study of the advantages and means of promoting unit operation, and that a record of existing results from pools be assembled for general discussion at the New York meeting in February. To make this activity effective it is suggested that a special committee of six be appointed to direct this study."

Dr. Joseph B. Umpleby, chairman of this division, appointed on this committee Earl Oliver of Ponca City as chairman, and working with him will be K. C. Heald, of the Gulf Production Co., A. W. Ambrose, Empire Gas & Fuel Co.; Harry H. Hill, Standard Oil Development Co.; F. H. Lahee, Sun Oil Co., and Joseph Jensen, Associated Oil Co.

This committee is to gather together all available data on the actual work that has been done by the various companies in putting unit operation into effect for it does not seem to ge generally recognized that this is no longer a theory but an actual operating condition found in many of our larger oil fields.

While unit control is not operating under a condition of 100 per cent pooling of interests it has been found that it is very effective if from 60 to 75 per cent of the operators join in the work, and is profitable to everyone interested in the acreage, and this includes the fee and royalty owner as well as the production companies.

Mr. Farish's Address

W. S. Farish, president of the Humble Oil & Refining Co., addressed the meeting and stated that the observations of his company officials agree fully with the conditions as outlined in the paper that had just been presented by Joseph E. Pogue, which is printed elsewhere in this issue of The Oil and Gas Journal.

Mr. Farish said in part that in as much as nature had deposited the oil and gas in pools that should be considered as units and as man had made the subdivisions of the surface without regard to this natural condition it is very evident that man must submit to nature's method sooner or later and the cut-throat idea of development cease.

"The older methods of development of oil pools is economically unsound and as cost is the key to the economic situation these costs must be lowered and experience in unit controlled pools, even though they might not represent 100 per cent of all interests, had been such that they had very materially reduced their drilling and operating costs.

"The problems concerned with the means and methods of locating structures and then drilling and producing them have been well solved by the geologists and engineers and the machinery is at hand to produce oil in any quantity that the conditions demand, and it has been fully demonstrated that overproduction of this commodity is very easy of attainment if caution is not used in applying these engineering principles.

"The market for the refined products has been expanded to about its limits for when fuel oil can undersell coal, its only competitor as a heating unit, something is fundamentally wrong with the oil industry which is throwing into another market a commodity that might well be used for other purposes than selling it as a by-product of the industry."

Must Control Output

New uses for petroleum products have been developed within the past years, but the growth of the industry has been very largely dependent upon the expanding use of the internal combustion engine and this has about reached its limit of expansion if viewed from the standpoint of the ability of the oil industry to supply gasoline and lubricating oils. In other words, Mr. Farish does not think that the oil industry can look for much relief in the direction of added markets for its products and therefore must bring about adjustment within its own ranks and control of its output.

"The refinery," Mr. Farish said, "has been developed to the point where more finished products are being extracted from the barrel of crude oil and further expansion in that direction will further curtail the need of producing more crude oil, for each barrel will yield a proportionally greater amount of these finished products; until it may ultimately be possible to produce 100 per cent gasoline from each barrel of petroleum.

"Overproduction is not a new thing with the oil industry for during the past 10 years it has suffered from too much oil being brought above the ground due to its competitive form of operation where every operator seemed to consider that if he did not get his share of the oil within the pool at once his chances for getting it later were materially reduced. Quick returns of the money invested in land and equipment was the basis for all operations and as the forces of nature work to the end of producing a large quantity of the oil that can be recovered in a very short time it has been the practice to flow the wells wide open during the early part of their life and by such methods every new pool became a menace to the stability of the whole industry.

"Quick returns of money invested by the producer has on the other hand cost the industry money for storage and handling of this oil and on this it is now paying a very large interest charge each year that would not have been necessary if this oil had been allowed to remain in its original reservoirs."

Mr. Farish seems to think that the industry as a whole has not made use of the tools at its command to correct this condition and looks to the engineer to educate and direct the thoughts of those interested, not only the producing company officials, but the fee and royalty owners and the public at large, to these evils and suggest ways of remedying them.

Unit Control Reduces Cost

By the use of unit control methods of producing oil pools, Mr. Farish continued, it has been found that the costs have been reduced one-half of what would have been necessary if the unrestricted operation program had been followed, and Mr. Farish expressed the hope that this cost could be further reduced

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She's Just Wild About the Oil Show

Delbert's Wife Never Saw Anything So Lovely in Her Life Before and She Thinks Oil Men Are Too Fascinating for Words

As Told to Thomas F. Smiley

I'm just wild about this exposition thing and I do think these oil men are too fascinating for words. I wouldn't have missed it all for anything. And do you know, Delbert thought I wouldn't care for it. His company makes some kind of machinery for use around the oil wells, so he had to be here. He tried to discourage me when I said I'd like to go too. He talked about the long ride on the train, said the show wouldn't interest me and even hinted that I wouldn't understand what it was all about.

Well, he knows better now. He never saw anybody more interested than I have been. Wherever Delbert goes I go too. He's tired out when night comes, with all the people he has to see and everything. "Delbert," I said last night after we had gone to our room in the hotel, "this is a hard week for you and I'm so glad we decided I'd better come too. Just think how much more trying it would be for you if you were here alone. Aren't you glad I came?"

The poor man was just too tired to answer. I didn't press him to talk. Some wives don't have any tact, you know. Well, whatever else I may lack, I pride myself on having tact, so I just patted Delbert's head and told him sort of soothingly, "There's no use in having a wife if she can't be at her husband's side when she is needed. You just settle down comfy in that chair and I'll read you the installment in tonight's paper about Helen and Warren." I always read that feature in the paper at home and I was sure it would get his mind away from his worries.

Not in Mood for Literature

Delbert kind of slumped down in his chair and let out a little groan, he was just that tired. I read to him and when I had finished I asked him if he didn't want me to read something else light and entertaining. He said sort of chokingly, "No, for the love of Mike," and looked at me in a distracted sort of way that would have frightened me if I hadn't known him so well. When a man's work has frazzled his nerves that way the best thing to do is to humor him, so I decided to leave him alone for a while. "You sit here quiet and rest," I said, "and I'll go down to the hotel lobby and watch the crowds for a while."

When I went back to the room an hour or so later Delbert had gone. I thought it likely he had gone out for a walk, so I got into bed. I guess I must have gone to sleep right away. I looked at my watch under the pillow when Delbert came in and I was rather astonished to see that it was after 2 o'clock. His walk had done him a lot of good. Every little while he'd break into a little chuckle.

"I'm so glad you had a nice walk," I said. "You feel better, don't you dear?"

"Don't see how I could feel any finer," Delbert replied with a little titter that didn't sound just natural. And then he went on, "Say, Tom Moroney was telling me a good story. You'll want to hear this one. A woman called up the hotel clerk from her room one night and complained about noise that was keeping her awake. 'I'm sorry, madam,' the clerk replied, 'but they're holding an Elk's ball on the second floor.' 'Well,' the woman retorted indignantly, 'why don't they—' "

This Must Have Been Good

And then Delbert burst into a fit of laughter. He was just sort of hysterical, I think, from overwork. He calmed down after a while, but he seemed to forget that he had been telling me a story. Realizing how much he needed the rest, I didn't remind him and pretty soon I went to sleep again.

When I woke up it was daylight. Delbert was asleep sitting right where he had been when he was undressing. I shook him and got him into bed without fully waking him up. He slept till almost noon. "I'd like to hear the rest of that story now," I said after he had taken his bath and shaved.

"What story?" he asked, looking puzzled.

"Why, the one you started telling me when you came in last night," I replied.

Delbert said "Oh," and then all his attention seemed to be needed in digging around in his bag for a fresh collar. When he did find the collar his thoughts had turned to something else, I guess, for he never did tell me the rest of the story, and I didn't want to keep pestering him, knowing how tired he was. But aren't men funny?

Oh, I think everything at the exposition is simply wonderful. I really didn't suppose there was so much to learn about the oil business. I'll confess I didn't know a great deal about it before I came to this exposition, and when I'd hear Delbert referring to different things in his work I wouldn't always know what he was talking about. Well, I'll know after this, for I've made it my business to learn pretty near everything there is to learn about the oil industry while I have this chance. I'll be a real help to Delbert from now on. I've picked up a lot about the gas business too, though I'm not so much interested in that. For one thing, I'm not sure which we use at home, the natural gas or the unnatural.

Most Thrilling of All

The most thrilling exhibit in the whole exposition, I think, is a pipe line pumping station built on absolutely scientific principles where everything is done automatically by electricity or something. Mr. Heltzel is in charge of it. He is chairman of some committee or other. Delbert knows him real well and calls him Bill. He introduced me, and I said, "Mr. Heltzel, I want you to explain this whole marvelous thing to me." Of course Delbert had to interfere, said something about Mr. Heltzel being very busy, but just the same he probably was really proud that his wife took an interest in such things.

Mr. Heltzel was very nice. He could see how deeply in earnest I was and he explained everything so that it was perfectly clear. To begin with, ever since Sir Francis Drake, the first oil man—I think it was Sir Francis, for he was always discovering something or other you know—found out that there was actually more oil under the ground than there was on top they have been getting it in all sorts of out-of-the-way places. If you didn't stop to think you'd suppose the best way would be to drill the oil wells near the refineries, but you see they save money by drilling where land is cheap. In California, I understand, they are even drilling wells out in the ocean. You can buy ocean bottom land for next to nothing I suppose. It just goes to show how smart and far-seeing these oil men are.

Well, anyway, after they get the oil they have to get it to the refineries. To do that they build great pipe lines. I knew they did something like that, of course, but I had supposed they just poured the oil into one end of the pipe line with a big funnel or something and that the oil then ran to the place where they wanted it, but Mr. Heltzel explained that the oil won't always run of itself. Sometimes it has to go over a hill for instance. So they have these stations. This one at the exposition is just lovely. They have evergreen trees and shrubs and everything.

Colored Lights, Alarm, 'n Everything

There is what Mr. Heltzel called a pump, and it goes right before your eyes. Then there are all sorts of queer looking charts and something that looks like a big thermometer. There are some red and green lights, a fire alarm and a time clock. It isn't like the ordinary time clock at all, but I suppose the workmen punch it as they come on, for everything is so systematic and scientific. It has a lot of other uses too, which just goes to show how far ahead the oil men are in such things.

And who else would have thought of having those red and green lights? When the way is clear for the oil to be run through the pipe line a man turns on the green light, where everybody in the station can see it. If they want to stop the oil they turn on the red light. It's just applying the principle of the traffic signals in our cities, you see.

And that fire alarm! It really isn't a fire alarm as I found out later, but when it went off the first time I thought it was, and I jumped. Mr. Heltzel laughed and explained that there wasn't any fire, that the alarm was just a part of the machinery. It sounds this alarm whenever one seems to be needed. A bright idea, all right.

Did I mention the gate valves? There are several of them. I didn't ask why they call them gate valves, but I suppose they have something to do with the receipts. There are a lot of interesting things on the walls—an indicating ammeter, a wattmeter, a voltmeter and other things, and from what Mr. Heltzel said they all have something to do with really scientific pipe line work.

Yes, Harry's in the Oil Business

Harry Norris came in while I was there and I was introduced to him. Mr. Norris they call a chief scout. I suppose it's because of service in the war. I took it that he was in some department of the oil industry, for he remarked as he looked over the machinery and all the queer things connected with it, "Well, this business is getting too complicated for me. I'm going back to the farm and raise cotton." Mr. Heltzel laughed and I assured Mr. Norris that it wasn't so complicated after all and that I would be glad to explain it to him; but he said no thanks, he had to meet a man in five minutes.

And I met Mr. Way, too. He's the general manager. If it hadn't been for a bit of bad luck he would have taken me through the whole show. Wouldn't that have been grand and wouldn't it make the women back home jealous? Delbert had left me in the Scientific and

(Continued on Page 96)

ONE REASON FOR SUCCESS OF OIL SHOW

Just how much the wonderful success being enjoyed by the Sixth International Petroleum Exposition and Congress is due to the untiring efforts of Arch W. Leonard, treasurer of the organization, probably never will be realized: Modest and unassuming (except when a photographer endeavors to take his picture or when the writer tries to make an appointment for Tom Smiley to get material for a full page human interest sketch) Mr. Leonard accomplishes more in five minutes than most fellows could finish in half a day. He is always on the job at the Exposition grounds—early and late. Bill Way claims to reach the grounds at 5:30 o'clock every morning and to be there constantly from that time until midnight, but he admits Arch greets him every morning with "Where have you been all morning?" and when Bill finally drags himself away at night, Arch wants to know why he is leaving so early.

Arch W. Leonard

Mr. Leonard, in addition to being treasurer, which necessitates his looking after all ticket sales, gate receipts and a hundred other things, besides signing checks, etc., is chairman of the executive committee of the Exposition. When one considers the vast amount of work connected with staging the world's greatest industrial exhibit, it is not hard to realize Arch has a man-sized job.

Another remarkable feature is the fact Mr. Leonard is president or head of so many active companies in the Mid-Continent area it would take a column of space to list them all. And all are being managed just as well and as successfully as the Exposition. All of which causes the comment: "Some man. Some worker."

Refiners Reduce Runs During October

Attempt to Stabilize Market by Limiting Operations. Three New Plants Added in North Central and West Texas Areas

By W. T. Ziegenhain

During October the Mid-Continent refinery crude runs will average 7,580 bbls. less than September, despite the addition of three new plants. The bulk of the decrease has been in Oklahoma and Kansas, while small increases are shown in both West Texas and North Central Texas. Compared to a year ago, the runs this month will be approximately 2,500 bbls. less, reflecting the general desire on the part of refiners to reduce gasoline stocks to a minimum in supplying the present favorable post season demand.

By reducing runs, the Mid-Continent has strengthened its marketing position and while this cannot be directly interpreted in prices at present, it has given the market more stability. Similarly, the decrease in the crude production of more than 93,000 bbls. daily within the past six weeks has dampened the idea a crude cut is pending. Such a price cut had been anticipated by some refiners who saw the production figures added to weekly and set out early to reduce their gasoline stocks by offering their product at prices substantially below the general market. This naturally created a general depression but conditions are shaping themselves to permit a more optimistic view to be taken of the refinery situation over the balance of the year.

At present prices many refiners say they cannot show a profit from their operations. This is said to be particularly true in the West Texas and Central Texas areas. Substantial reductions in runs are shown in a few of the larger plants in these areas but this is more than overcome by the addition of new plants and the accumulation of small increases in many smaller plants whose principal outlet is local consumption. Included in the new plants in this territory is the Gulf Oil & Refining Co.'s 5,000-bbl. plant at Sweetwater, Tex., which is running 4 000 bbls. of crude. A new plant, built by the Central Texas Refining Co. at Luling, Tex., was also placed under full operation, the plant having a capacity of 2,500 bbls. daily. The other addition is the Humble Oil & Refining Co.'s new 5,000-bbl. plant located at Neches, Tex. This plant is running 3,000 bbls. daily.

MID-CONTINENT REFINERY OPERATION

Based on Operations October 1, 1929, and September 1, 1929

Districts—	No. of plants	Daily crude cap. (bbls.)	Daily crack'g cap. (bbls.)	Plants Oper. Oct. 1	Runs to stills Oct. 1	Plants Oper. Sept. 1	Runs to Stills Sept. 1	Daily Dec. Oct. 1
Arkansas	9	44,800	13,150	8	31,450	9	32,350	900
Kansas	16	132,600	73,850	15	91,500	15	94,950	3,450
North Louisiana	6	58,700	23,500	6	37,400	6	40,100	2,700
Oklahoma	47	307,800	116,750	44	210,060	44	218,350	8,290
N. & Central Texas	36	166,700	25,600	33	101,830	31	†7,900	†,970
West Texas	29	143,000	53,850	27	72,480	25	68,650	†3,830
Total	143	851.000	306,100	133	544,720	130	552,300	7.580

†Increase.

RUS TO STILLS AT MID-CONTINENT REFINERIES

1927	
September 1	422,150
October 1	420,955
November 1	426 654
December 1	417,455
1928	
January 1	415,125
February 1	418,275
March 1	427,145
April 1	451,225
May 1	479,225
June 1	487,135
July 1	506,310
August 1	543,625
September 1	563,270
October 1	547.820
November 1	550 000
December 1	520,000
1929	
January 1	508 550
February 1	506,800
March 1	514 950
April 1	530,530
May 1	577,500
June 1	585,030
July 1	565,800
August 1	555,250
September 1	552,300
October 1	544,720

Oklahoma

The reduction in the Oklahoma refinery runs amounted to 8 290 bbls. daily. This is accounted for principally by 1,000-bbl. reduction in the larger plants. There was no other change in the status of operations except the temporary shut-down of the Illinois Oil Co.'s plant at Cushing, while changes in piping are being made to tie in the operation of a new 1,000-bbl. cracking unit. A change in name occurred in one plant when the Remington Oil Co. purchased the incompleted plant of the Wewoka Refining Co. at Wewoka. The refinery will be completed to run 2,000 bbls. and its operation will be started about October 5. On November 1, the Texas and Pacific Coal & Oil Co. plans to shut down its plant at Wynnewood, until next spring.

Kansas

Kansas showed a reduction in runs for October of 3,450 bbls., this being the result of small reductions in a number of plants. Except for this general reduction there was no change in the operations for the month.

North Central Texas

The runs of the refineries in the North Central Texas refining area will show an increase of 3,930 bbls., the increase being the result of the operation of the new Humble Oil & Refining Co.'s plant at Neches and the resumption of operations in the Simms Oil Co.'s plant at Dallas. The runs in the other plants remained practically unchanged.

West Texas

As in the case of North Central Texas, the West Texas runs were increased by the starting up of additional plants rather than increased runs in the other plants. The runs in this area were increased 3 830 bbls., all of which is due to the starting up of the Gulf Oil & Refining Co.'s plant at Sweetwater, which is running 4,000 bbls. daily and the addition of the Central Texas Refining Co.'s plant at Luling which is running 2,400 bbls.

Arkansas and Louisiana

Arkansas showed a decrease in the refinery runs of that state of 900 bbls. and the North Louisiana refining area showed a reduction of 2,700 bbls. The major change in this territory was the shutting down of the Houston Oil & Refining Co.'s plant at Camden, Ark., the reason for the shut-down being given as due to a lack of crude. The shut-down was expected to be temporary but no date of resuming operations has been set.

REFINERY OPERATIONS IN OKLAHOMA

(Plants which have been in operation during the past year)

Name and address—	Daily capacity	Runs Oct. 1	Runs Sept. 1
Anderson-Prichard Oil Co., Cyril	4,000	4,000	4,000
Barnsdall Refineries, Inc., Barnsdall	6,000	4,000	4,000
Barnsdall Refineries, Inc., Okmulgee	10,000	4,000	4,000
Bell Oil & Gas Co., Grandfield	4,500	2,000	1,900
Champlin Refining Co., Enid	16,000	11,000	12,500
Citizens Refining Co., Seminole	1,000	100	100
Continental Oil Co., Sapulpa	10,000	2,000	2,000
Continental Oil Co., Ponca City	30,000	14,000	15,000
Cushing Refining & Gasoline Co., Blackwell	1,800	1,500	1,500
Cushing Refining & Gasoline Co., Cushing	3,500	2,500	2,500
Eason Oil Co., Enid	5,000	3,000	3,000
Empire Oil & Refining Co., Cushing	5,000	4,700	4,700
Empire Oil & Refining Co., Okmulgee	4,000	4,000	4,000
Empire Oil & Refining Co., Ponca City	7,500	7,500	7,500
Garber Refineries, Inc., Garber	3,500	3,300	2,900
Gilmer Oil Co., Ringling	3,000	(*)	(*)
Globe Oil & Refining Co., Blackwell	7,500	7,000	7,000
Globe Oil & Refining Co., Cushing	15,000	12,000	11,000
Homaokla Oil Co., Allen	3,000	300	500
Illinois Oil Co., Cushing	3,000	(*)	2,400
Imperial Refining Co., Ardmore	5,000	3,000	3,300
Independent Oil & Gas Co., Okmulgee	5,000	5,000	5,000
Johnson Oil Refining Co., Cleveland	6,000	6,000	6,000
Mid-Continent Petroleum Corp., West Tulsa	40,000	22,000	25,000
Northwestern Refining Co., Tonkawa	3,000	2,500	3 000
Peppers Gasoline Co., Covington	1,000	750	700
Pierce Oil Corp., Sand Springs	8,000	7,000	7,000
Producers Oil Co., Bristow	2,500	1,500	1,500
Producers & Refiners Corp., West Tulsa	6,000	3,500	3,000
Pure Oil Co., Ardmore	5,000	2,300	2,300
Pure Oil Co., Muskogee	9,000	8,000	8,000
Remington Oil Co., Wewoka	2 000	(†)	(*)
Rock Island Refining Co., Beckett	2,500	2,000	2.000
Shaffer Oil & Refining Co., Cushing	10,000	10,000	10.000
Sun Oil Co., Yale	5,000	5,000	5,000
Sinclair Refining Co., Muskogee	1.000	500	600
The Texas Company, West Tulsa	15.000	14.000	14.000
Texas Pacific Coal & Oil Co., Wynnewood	2,500	1,200	1,650
Tidal Refining Co., Drumright	11,000	10,000	11,000
Transcontinental Oil Co., Bovnton	2 500	2,000	2.000
Transcontinental Oil Co., Bristow	5 000	4.000	4,000
Western Oil Corp., Beckett	2,000	1,500	1.500
White Oak Refining Co., Allen	6,000	5,210	5,200
Wilcox Oil & Gas Co., Bristow	5,000	2,000	2,800
Wirt Franklin Petroleum Corp., Ardmore	4,000	2,600	2,400
Yale Oil Corp., Yale	1,500	1,000	900
Total	307,800	210,060	218,350

*Shut down. †Will start October 5.

REFINERY OPERATIONS IN KANSAS

(Plants which have been in operation during the past year)

Name and address—	Daily capacity	Runs Oct. 1	Runs Sept. 1
Barnsdall Refineries, Inc., Wichita	4,000	2,500	2,500
Derby Oil Co., Wichita	6,000	4,000	4,000
Eldorado Refining Co., Eldorado	3,500	3,200	3,500
Golden Rule Refining Co., Wichita	1,500	1,000	1,000
Kanotex Refining Co., Arkansas City	10,000	3,500	5,000
Independent Oil & Gas Co., Kansas City	6,000	5,000	5,000
National Refining Co., Coffeyville	6,500	6,000	6,000
Peerless Oil Refining Co., Chanute	3,000	1,700	2,250
Shell Petroleum Corp., Arkansas City	22,000	17,000	17,000
Sinclair Refining Co., Coffeyville	10,000	8,000	8,000
Sinclair Refining Co., Argentine	9,500	5,000	6,000
Skelly Oil Co., Eldorado	23,000	12,500	12,200
Standard Oil Co. of Kansas, Neodesha	12,000	11,000	10,000
Vickers Petroleum Co., Potwin	3,500	2,600	2,500
White Eagle Oil & Refining Co., Augusta	10,000	8,500	10,000
Wilhoit Refining Co., Joplin, Mo.	1,500	(*)	(*)
Total	132,000	91,500	94,950

*Shut down.

REFINERY OPERATIONS IN NORTH CENTRAL TEXAS

(Plants which have been in operation during the past year)

Name and address—	Daily capacity	Runs Oct. 1	Runs Sept. 1
American Refining Properties, Wichita Falls	6,000	1,500	2,500
Archer Refining Co., Wichita Falls	2,000	400	500
Central Texas Refining Co., Angus	4,000	2,100	1,700
Central Texas Refining Co., Minerva	2,000	800	700
Continental Oil Co., Wichita Falls	6,000	2,600	3,200
Dale Oil & Refining Co., Electra	4,000	3,500	4,100
Empire Oil & Refining Co., Gainesville	5,000	3,600	3,.00
Falls Refining Co., Wichita Falls	2,000	1,000	1,000
Gulf Refining Co., Fort Worth	10,000	6,000	6,000
Humble Oil & Refining Co., Breckenridge	2,000	1,200	1,500
Humble Oil & Refining Co., Chilton	4,000	3,600	1,700
Humble Oil & Refining Co., Neches	5,000	3,000	(*)
Superior Refining Co., Tiffin	2,000	(*)	(*)
Iowa Park Producing & Refining Co., Iowa Park	2,500	1,200	1,500
LaSalle Petroleum Co., Burkburnett (Noble)	3,500	1,800	1,600
Macmillan Petroleum Co., Isom	6,500	6,000	6,000
Magnolia Petroleum Co., Fort Worth	12,000	4,000	4,300
Magnolia Petroleum Co., Corsicana	5,000	3,200	3,500
Olney Oil & Refining Co., Olney	2,000	(*)	(†)
Oriental Oil Co., (Trinity) Dallas	5,000	3,300	3,300
Orient Petroleum Co., Wichita Falls	2,500	1,500	1,000
Panhandle Refining Co., Wichita Falls	5,000	3,830	3,800
Pampa Refining Co., Pampa	4,000	2 500	3 100
Phillips Petroleum Co., Isom	10,000	8,000	9,000
Primrose Refining Co., Wichita Falls	2,500	2,000	1,200
Primtex Refining Co., Grand Prairie	2,500	500	500
Simms Oil Co., Dallas	5,000	2,500	(*)
Star Refining & Producing Co., Fort Worth	1,800	500	500
Taxman Refining Co., Wichita Falls	2,500	(*)	(*)
The Texas Company, Dallas	16,000	15,000	16,000
The Texas Company, Amarillo	4,000	3,000	4,000
Tidal Western Refining Co., Burkburnett	3,000	2,000	2,000
Texas Pacific Coal & Oil Co., Fort Worth	3,000	2 200	2,200
Transcontinental Oil Co., Fort Worth	5,000	4,500	3,500
Waggoner Refining Co., Electra	3,400	3,000	2,400
White Eagle Oil & Refining Co., Fort Worth	6,000	2.000	2,000
Total	166,700	101,830	97,900

*Shut down. †Operating part time.

(Continued on Page 235)

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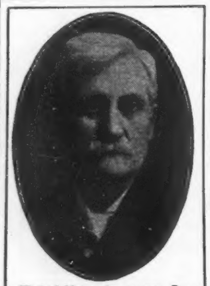

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UNIT CONTROL NEXT

Unit control of pool operations is coming.

Not by law, State or Federal, but by the action of operators themselves.

It is the next step in the progress of the industry's development of co-operation and conservation.

It is following exactly the course taken by the movement for curtailment of flush production.

At first scoffed at as impracticable and impossible, the irresistible trend of events has forced it to the front. More and more, men who laughed when it was first suggested are coming to discuss it seriously.

The success of the air-gas lift and its educative effect in enlightening the industry about conditions in the sands had a lot to do with this altered attitude of mind. Conservation of gas energy came to mean something tangible.

At the same time the continued discovery of new pools and the prolongation and even expansion of overproduction, necessitating revival of curtailment programs, indicated that what is needed is not merely co-operation after the flood of new oil is upon us but co-operation before it is let loose.

So it is not surprising to find the Petroleum Division of the American Institute of Mining and Metallurgical Engineers, after listening to an address by President W. S. Farish of the Humble Oil & Refining Co., adopting a resolution to make a special study of the advantages and means of promoting unit operation, gathering all available data on actual work in the various pools, and appointing a special committee to direct that study and prepare a report for general discussion at the annual meeting of the Institute in New York in February.

It is significant, too, that Mr. Farish emphasized that, although in some cases it had not been possible to obtain 100 per cent co-operation in pools, unit control has been found very effective if 60 or 75 per cent of the parties interested co-operated.

This disposes of the objection that 100 per cent co-operation is impossible and that it is useless to attempt it without it. One of the most familiar obstacles to progress is this waiting for an unattainable unanimity.

If co-operation by 60 to 75 per cent shows the advantages which Mr. Farish reports they will very soon be convincing to the minority. There are always objectors who can be convinced only by an actual demonstration which permits of no argument.

The supposed legal difficulties which so bedeviled the industry when co-operation in curtailment was first proposed vanished when operators decided to go ahead among themselves.

Similar difficulties have been evoked in regard to the plan of unit control with prolonged discussion of suggested complicated solutions.

It is now practically agreed that if operators will agree among themselves on a plan for unit control no legal issue will be involved.

Such an agreement, before development of a pool, upon a definite plan to secure the most efficient use of the gas industry, the maximum production of oil and the most economical operation is assuredly within the rights of those interested in the prospective pool and can in no way be interpreted as ethically or legally in restraint of trade.

On this point it is well to remember that the very first report of the Federal Oil Conservation Board explicitly stated that "voluntary co-operation offers the only practical hope."

"The voluntary co-operation proposed would need to include the landowners and operators in a single field or pool, which is a relatively small unit of production, so that the possibility of monopolistic control need not be feared."

The fact that unit control has already been tried without waiting for anything shows that the will to try it is the first essential.

The address of Mr. Farish before the engineers should go a long way to promoting that will among operators, landowners and royalty owners. It carries the authority of a practical operator fully conversant with all phases of the question.

The uneconomic and wasteful results of unnecessary competition are becoming thoroughly understood.

The contrary results of conservative operation, the conservation of gas energy, production of oil as needed, the elimination of overproduction that depresses markets, are now being recognized.

President E. B. Reeser of the American Petroleum Institute very aptly illustrated the situation in the oil industry in his address before the engineers' meeting when he asked:

"Would the coal industry be stabilized and prosperous if each company employed an engineering staff with instructions to increase production? Would United States Steel and other stocks in that industry be selling at present levels if the companies operated on a maximum output basis?"

It is time, as he said, when the engineering knowledge and skill of the oil industry was set to work figuring out means of stabilizing rather than increasing production; in avoiding the unnecessary costs of handling and storing surplus production that demoralizes market values and forces oil to compete with cheaper coal.

The action of the Petroleum Division of the A.I.M.E. is a step in the right direction. With the engineers of the industry studying the possibilities of unit control, based on actual work and results, supplemented by their technical knowledge and experience, we should have a definite chart to follow.

Besides the engineering phases there will doubtless be other factors that will require attention, amended lease forms, for instance, which should engage the attention of the legal advisers of the industry, and managerial questions for the executives to decide, but these can be solved as the industry makes up its mind about unit control.

Where there's a will there's a way.

The big point just now is that men are discussing unit control as desirable, are noting its advantages and contrasting them with the known effects of unbridled competition.

A few months ago you could hear skeptical comment about the effect of co-operation for curtailment at Seminole, but when the industry got into another difficulty at Oklahoma City there was little difficulty in reviving co-operation there.

Co-operation to curb overproduction is here as a settled policy. But too often it is too late to be most effective. Unit control will lock the stable door before the steed is stolen.

New Records
in Pipe Line Laying
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Operating Costs of Prime Movers

Comparative Figures for Drilling Wells. Difficulties Encountered in Finding Information for Calculations

By Charles L. Shirley, M. E.
Shell Petroleum Corp.*

In attempting to arrive at a definite figure, which can be assumed as the probable operating cost of the prime mover, the following difficulties will be encountered in finding information relative to cost:

Information will be:

1. Absent.
2. Vague or indefinite.
3. Partial or incomplete.
4. Biased.
5. Incorrect.
6. Arbitrary.
7. Influenced externally.

If questioned as to reasons why these records are not kept by the operator, often the answer is basically sound from an economic and financial point of view.

1. Records may be absent because the operator does not keep records and could not correlate them if they were kept.

In one specific case, there is no economic urge to bother with establishing costs. In this instance, the initial well in the field was a larger gasser. All subsequent wells drilled produced at high pressures and gave up much free gas at the traps. This was carefully measured for two reasons. One reason was, to determine the royalty payment and the other was to assist the field operators in holding back pressures and a definite gas-oil ratio. All free gas was turned into a gas plant gathering system. Gas production often exceeded the capacity of the gasoline plant. This meant that surplus gas was allowed to flow into the open, as no commercial market existed.

The fuel system was connected from the gasoline plant residue system. Since the practice was to flow all surplus gas into the air, no meter was attached to the residue line.

The nominal cost of the gas and the gas gathering system was charged to the gasoline plant operations. The residual fuel system was charged to general lease operations. Since the residual gas had no commercial value, it would be both troublesome and expensive to assign it a book value, no charge was set up for the fuel used in lease operations, which included drilling.

Impossible to Analyze

While this practice of cost accounting was sound and of good method, it was impossible to scientifically analyze certain specific data, as in this case, the cost of fuel.

2. Information, which may be classed as vague or indefinite, is frequently encountered when attempting to find the operating and maintenance history of a piece of equipment. The inactive history of any item of oil field equipment is always a blank. Often inactive equipment is loaned, later to be returned in better or worse condition. Loaning of equipment is seldom a matter of record.

3. In the Mid-Continent area, the wells are generally drilled by contractors using their own tools. The operating company follows the practice of furnishing the contractor free fuel and water. The operating company may keep accurate records of fuel and water used, but they are seldom interested in the number of gallons of lubricant used. Since the contractor is usually furnished free fuel and water in unlimited amounts, he is more inclined to use excess water and gas, particularly, if he believes he can reduce his expenses. Example: Very frequent boiler washings.

4. Bias is the example of a dealer to furnish cost statements favorable to his particular equipment.

5. Errors and misunderstanding are the basis of most of the incorrect operating figures.

6. Costs are calculated in order that profits may be determined. Values are directly related to profits. Taking Grunsky's definition of value, "the worth of anything measured by any standard of purchasing power," as a basis, it follows that costs are based upon expected profits.

Arbitrary Cost Figures

Many arbitrary cost figures have been established for the following reasons:

a. Taxes.
b. Amortization of investment.
c. To establish a sales value.
d. To excuse investments and operations.

Since the Federal Income Tax distinguishes between investment costs and operating costs, it became necessary to assign a definite value to anything used in development. For example, in Seminole, water is usually valued at 5 cents per barrel, and companies operating in the Seminole area often set up this cost of water in other districts. Gas is often charged to development at a flat rate per boiler. This is true when small companies not in the gas distribution business sell gas, or when an arbitrary figure is established by accountants.

One company uses a flat rate for water charge to drilling operations at $10 per boiler. This covers Oklahoma and Kansas, except the deep areas, where high pressure, large capacity boilers are used, and the Wildcat Jim area in southern Oklahoma. The water rate at Seminole is $15 per boiler. The rate used at Wildcat Jim is $25 per well, regardless of the number of boilers used.

The arbitrary figures noted are possibly accurate, and in general, are based on the approximate cost of the items if purchased for an external source.

The arbitrary values set up for depreciation, interest and supervision are more or less standard, in order to conform with the tax laws and regulations as administrated.

Where such a cost system has been established, it is very difficult to change or revise it.

7. Certain information is withheld or released in part. Propaganda and camouflage may be introduced to influence cost statements.

Operating Conditions Vary

After having collected and balanced the miscellaneous information received in reference to the foregoing, the compiler will find that he has no information as to the figures of fact. As every drilling operation and well has different locations, in a like manner the operating conditions will vary.

An instance can be cited of two offset wells recently drilled on the same lease by the same company. The same size hole was drilled in both cases and similar strings of pipe were set. These wells were drilled with rotary tools using steam power. The depth of "A" was 4,047 feet. The depth of "B" was 3,754 feet. "A" was drilled in 41 days drilling time, "B" in 39 days. Fuel for these wells was purchased externally and metered. The cost of fuel and water for "A" was $1.26

(Continued on Page 238)

*Before Mid-Continent district, A.P.I. Division Development and Production Engineering, Tulsa, October 8.

CHART NO. 1
AVERAGE FUEL COSTS FOR CABLE TOOL DRILLING WELLS (FREE WATER ASSUMED)
GAS FIRED

District—	Av. depth feet	No. wells	Power	Av. day using free energy	Fuel or energy Total	Av. p/day	M. cu. ft., bbls. or K.W.H. av. p/ft.	Average cost of fuel-energy— Total	Av. p/day	Av. p/foot	Complete drilling cost— Total	Av. p/day	Av. p/foot
Salt Creek	1,822	149	Steam	68	....	....	....	....	....	....	$15.943	....	8.75
Salt Creek	1,978	264	Steam	69	....	....	....	....	....	....	16.436	....	8.31
Compression	1,978	...	.....	69	...	....	....	$1.380	$2,000	$0.70	.....	....	...
Oil Fired Boilers (Two Boilers on Gas 33 Days each @ $30 per day)													
Fairport, Kans.	2,950	6	Steam	60	$10	13	.27	1.828	30.30	0.62			
Kansas	2,556	2	Steam	127	....	....	....	2,300	18.10	0.90			
Electric Motors (Central Station)													
Salt Creek	1,730	214	Electric	53	19,164		11.10				13,667		7.90
Salt Creek	1,786	301	Electric	49	17,581	359	9.84	235	4.81	0.13	Av. K.W.H.	$0.0134	
Salt Creek	1,577	54	Electric	61	16.788	199	10.64	230	3.78	0.15	Av. K.W.H.	0.0137	
Fairport, Kans.	2.977	3	Electric	49	37,087	745	12.48	1.037	21.10	0.35	Av. K.W.H.	0.028	
Fairport, Kans.	3.099	4	Electric	76	59 095	778	19.07	1.684	22.10	0.54	Av. K.W.H.	0.028	
Wichita, Kans.	3.476	8	Electric	71	52.588	744	15.18	1,025	15.39	0.31	Av. K.W.H.	0.027	
Wichita, Kans.	3.278	6	Electric	64	46,203	722	13.90	880	13.93	0.26	Av. K.W.H.	0.0187	
Wichita, Kans.	2,924	1	Electric	39	31,000	794	10.60	450	11.15	0.15	Av. K.W.H.	0.0145	
Gas Fuel													
Braman, Okla.	2 094	1	Waukesha	29	271	9.4	.13	18.97	0.65	0.009	7c p/M cu. ft.		
Kansas	3,503	2	Waukesha	94	1.845	19.6	.53	415	4.10	.185	20c p/M cu. ft.		
Gasoline (Gallons)													
Kansas	4,692	1	Waukesha	203	25,250	124	5.38	3,905	19.24	.832			

CHART NO. 2
COST PER FOOT FOR GAS AND WATER BASED ON ACTUAL GAUGE AND METER READINGS
SEMINOLE, DISTRICT
Rotary Tools

Depth with rotary tools feet	Days used gas and water	Av. hole per day	Gas used on well M ft.	Av. gas used p/day	Total cost for gas	Av. cost per day for gas	Cost p/ft. for gas	Water used on well	Average water used p/day	Total cost f./wtr.	Av. cost p/day for water	Cost p/ft. for water	Cost p/ft. for gas and water
3,750	33	114	12 836	388,970	$3.209.09	$97.24	$.96	34,426	1,043	$1,721.30	$52.46	$.46	$1.32
3.750	37	101	12,811	346.243	3,207.75	86.70	.86	35,585	962	1.779.25	48.09	.47	1.33
3 960	48	83	25.710	5"5.625	6.427.50	133.90	1.62	37,997	792	1.899.85	39.58	.48	2.10
11.460	118	298	51,357	1,270,838	12,644.25	317.84	3.34	108,008	2,797	5,400.40	140.09	1.41	4.75
Average 3,820	39.3	99.3	17,119	423,613	4,281.42	105.94	1.11	36,002	932	1,800.13	46.70	.47	1.58

CHART NO. 3
ELECTRIC POWER FOR DRILLING WELLS IN SEMINOLE AREA, OKLAHOMA

Depth ft.	ROTARY TOOLS— Days drilling	Billed demand	Total K.W.H.	Net bill	STANDARD TOOLS— Days drilling	Billed demand	Total K.W.H.	Net bill	Total bill
3,959	33	210	77.300	$1.417.10	32	50	6 420	$249.35	$1,666.45
3,818	44	210	75.800	1.403 22	30	50	38.700	1,056.96	2,460.18
3.796	37	210	94.600	1.665.71		Steam			
4,000	41	210	104.400	1,743.26		Steam			
3.770	33	210	89.670	1.287.44	30	50	18,400	491.16	1,778.60
4 031	52	273.75	138,800	2,632.70		Steam			
3,793	37	210	100,000	1,566.43	27	50	14.400	398.92	1,965.35
Total	277	1,522.75	6[illegible]900	$11.715.86	119	200	77.920	$2,106.39	$7,870.58
Averages	39	219.10	97,078	1,673.69	29.3	50	19,480	549.09	1,967.64

If all gasoline were Dubbs Cracked Gasoline there would be more profits in the refinery and less profanity on the road

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

OKLAHOMA AND KANSAS PRODUCERS VOTE TO STABILIZE PRODUCTION

By James McIntyre

A committee representing operators in the Oklahoma City, East Earlsboro, Greater Seminole, Allen, Sasakwa, St. Louis-Pearson and Logan County Fields in Oklahoma will appear before the Oklahoma Corporation Commission this week to petition the Commission to order a curtailment of production in the above named fields on a proration plan which would prorate Oklahoma City and East Earlsboro 40 per cent of their potential and the other fields named 20 per cent of their potential beginning November 1 and ending November 30, and prorate Oklahoma City and Earlsboro 50 per cent and the other fields named 25 per cent during the month of December.

The committee is made up of W. C. Franklin, Wirt Franklin, James A. Veasey, Harry H. Smith and Ray M. Collins.

The above action was taken Tuesday morning following a large meeting of Oklahoma operators held in Tulsa presided over by E. B. Reeser, president of the Barnsdall Oil Co., which had gathered to take action on a resolution adopted by a special committee of the Mid-Continent Oil & Gas Association recommending such proration. This resolution is given in full on Page 184 of this issue of The Oil and Gas Journal. It tells the story of the need for conserving oil in the ground and a plan for stabilizing the production of the State. The resolution had already been adopted by Oklahoma City and East Earlsboro operators and the Tuesday meeting was called to put the resolution before the operators in the other fields named above.

McPherson Shut Down

The important announcement was made at the meeting Tuesday that 12 companies operating in the McPherson County, Kansas, Field, namely Derby Oil & Refining Co., The Texas Company, Shell Petroleum Corp., Sinclair Oil & Gas Co., Barnsdall Oil Co., Indian Territory Illuminating Oil Co., Tom Slick Oil Co., Prairie Oil & Gas Co., the McBride interests, Gypsy Oil Co., Empire Oil & Refining Co., and Mid-Kansas Oil & Gas Co., had agreed to develop that field in a conservative manner. The Texas Company and the Derby Oil & Refining Co. each has a big well in McPherson County. The Derby well is a 1,000-bbl. Wilcox sand well located in Section 9-21-3w and The Texas Company's well a 1,332-bbl. well in chat, in Section 12-20-2w. The Wilcox sand well in Township 21-3w is the serious threat and brought about a plan to cut down the production of the Derby's well to 50 bbls. a day until January 1, 1930, and to forego further drilling in that area until that date. Two wells already started will be permitted to finish but when completed they must shut in for the time taken to drill the well, while the Derby Oil & Refining Co. will be permitted its discovery right of producing 100 per cent for a similar length of time unless further curtailment is deemed advisable.

Tuesday's meeting found Oklahoma operators unanimously in favor of stabilizing production. Not a voice was raised against the resolution and the vote was 100 per cent in favor of proration.

W. N. Davis urged the serious consideration of the unit plan of field development. Mr. Davis said he expected that within three years unit operations of new oil areas would be so general in this country that there would be no necessity for meetings like that of Tuesday and those that have been held before. There would be no overproduction because the output could easily be kept to market requirements. The leading oil companies, in the Mid-Continent Field, were unanimously in favor of unitization.

Adopt Proration Plan

Oklahoma City operators at a meeting held in Tulsa on Friday, October 4, adopted the proration plan recommended by a special committee of the Mid-Continent Oil & Gas Association. East Earlsboro operators had already adopted the suggested plan, which calls for a 40 per cent curtailment of the potential production of the two fields commencing November 1 and ending November 30, and 50 per cent proration during the month of December.

Meanwhile the 100 per cent shut-in of Oklahoma City continues until October 12 when the wells that have been shut in 30 days will be permitted to produce 100 per cent until November 1, and East Earlsboro is being curtailed 50 per cent which will end at the close of this month, only to be changed to a 40 per cent curtailment.

Pennsylvanians May Curtail

The numerous cuts in the price of Pennsylvania grade crude oil caused by overproduction of oil in the Bradford and Allegany Fields, have alarmed operators in that territory and it would be no surprise if they were to curtail excess production in the two areas named.

The most recent cut of 25 cents per barrel, bringing the price down to $3.05 per barrel, may not be the last if production continues to increase. It is said that wells now drilling and soon to be completed and put on pressure will increase the production of the Bradford Field by perhaps 5,000 bbls. per day. This will be purely excess production for which the purchasers cannot be expected to pay more than an overproduction price.

It would be an easy matter to stabilize production in the Pennsylvania area. Producers in the Pennsylvania grade

(Continued on Page 238)

PRAIRIE WILL PRORATE BY SUNDAY SHUT DOWN

Dana H. Kelsey, vice president and general manager of the Prairie Oil & Gas Co., announced Tuesday night his company would initiate the policy of shutting down on Sunday on all its operations in Oklahoma whenever the new proration program for Oklahoma was ordered by the Oklahoma Corporation Commission. This policy will be made effective as long as the curtailment plan is continued. Mr. Kelsey stated if the Sunday shut-down did not bring the Prairie's production down to the percentage permitted under the plan, his company's operations would be shut down on Saturday noon or any other time necessary to achieve the desired result.

A.P.I. WEEKLY REFINERY STATISTICS

The weekly report made to the American Petroleum Institute on refinery statistics—crude runs to stills, gasoline stocks and gas and fuel oil stocks—for the week ending October 5 follows:

	(1)	(2)	(3)	(4)
East Coast	100.0	3,339,000	4,177,000	9,014,000
Appalachian	88.0	612,400	798,000	808,000
Indiana, Illinois, Kentucky	98.8	2,091,100	4,068,000	3,653,000
Oklahoma, Kansas, Missouri	87.4	2,087,300	2,753,000	4,224,000
Texas	91.5	4,190,900	3,853,000	13,300,000
Louisiana and Arkansas	97.1	1,389,100	1,813,000	5,356,000
Rocky Mountain	90.7	434,600	1,715,000	941,000
California	95.4	5,008,600	12,588,000	107,935,000
Total United States	94.4	19,153,000	31,765,000	145,231,000
Texas Gulf Coast	100.0	3,257,600	3,691,000	10,184,000
Louisiana Gulf Coast	100.0	977,500	1,508,000	4,550,000

(1) Per cent refinery capacity represented. (2) Crude runs to stills. (3) Gasoline stocks. (4) Gas and fuel oil stocks.

High Spots in Field News

MICHIGAN

Show in Clare County wildcats.

NORTH LOUISIANA

Two Dixie Pool offsets bailed dry.

SOUTHWEST TEXAS

Dry offsets reported in Darst Creek district.

ROCKY MOUNTAIN AREA

New horizon found in Frannie district, Wyoming.

CALIFORNIA

State issues ultimatum to Ventura operators on gas conservation.

GULF COAST

New area opened in Humble Field by West Production Co.'s well flowing estimated 2,000 bbls. where two dry holes were drilled.

NEW MEXICO

Hobbs Pool extended half mile south by Midwest Refining Co.'s well making 430 bbls.

Increased drilling in San Simion district.

NORTH TEXAS AND PANHANDLE

Two new areas opened in Young County.

Showing in Fannin County.

Gray County curtailment agreement continued.

WEST TEXAS

Two new pools promised in wildcat areas, in Taylor and Ector Counties and another semiwildcat pool in Ward County.

Fifty drilling operations and 10 completed wells in Taylor-Link and Girvin Pools, Pecos County.

KANSAS

Derby Oil Co.'s No. 1 Stuckey, McPherson County, makes 1,047 bbls.

Empire company well probably opens new pool in Russell County.

Production in Kansas to show decline following proration in Valley Center.

OKLAHOMA

Sinclair Oil & Gas Co.'s No. 3 Stamper, Oklahoma City, takes fire, making 100,000,000 feet of gas and 150 bbls. of oil an hour. Is offset to Shell corporation's No. 2 Petty.

Oklahoma City to be wide open after October 12.

Slick's No. 1 Glidden, Oklahoma County, makes 980 bbls. in hour with 50,000,000 feet of gas.

Second Wilcox sand well in Payne County indicates good pool.

Late News from the Field

GULF COAST

HOUSTON, Tex., Oct. 5.—The Texas Company added two new wells from the deep sands south of Humble when it completed Nos. 268 and 269 Landslide. The former flowed at the rate of 402 bbls. daily from sand at 5,337 feet and the latter 1,100 bbls. at 5,210 feet. Humble Oil & Refining Co.'s No. 4 Williams, also south of Humble, was brought in over the week end flowing 240 bbls. daily at 4,348 feet. Gulf Production Co. completed its No. 52 Phoenix at Hull flowing 800 bbls. at approximately 4,100 feet.

KANSAS

Derby Oil Co.'s No. 1 Stuckey, NE cor. SE, Section 9-21-3w, McPherson County, made 1,047 bbls. for the 24-hour period ending 7:00 a.m., October 7. It made 107 bbls. in one hour from 11:00 to 12:00. The Wilcox sand was found at 3,322-25 feet. Production October 8, at 7 a.m., was 1,000 bbls.

Empire Oil & Refining Co. and Prairie Oil & Gas Co.'s No. 1 Bocks, C SE NE NE, Section 23-15-14w, Russell County, has apparently opened a new pool. This wildcat well found oil at 3,364-66 feet. The oil rose 2,000 feet in the hole. Tubing will be run and production test made.

Prairie Oil & Gas Co. and Tom Slick Oil Co.'s No. 1 Sellens, SW cor. NE, Section 36-15-13w, Russell County, has been drilled deeper. This test was completed two months ago in pay at 3,350-55 feet, where it has been pumping around 140 bbls. daily. It was deepened to 3,359 feet, and now has a hole full of oil.

Phillips Petroleum Co.'s No. 1 Johnson, SE cor. NW, Section 9-13-19w, Ellis County, has 1,000 feet in the hole from the Oswald at 3,592-96 feet, in 15 hours. The 6-inch casing was landed at 3,576 feet. A liner will be run and a production test made.

Tom Slick Oil Co. and others' No. 1 Shurr, NE cor. SW, Section 21-20-10w, Rice County, pumped 197 bbls. in 12 hours after being deepened to 3,284 feet. The top of the pay sand was found at 3,278 feet.

The Texas Company's No. 1 Munn, NW cor. NW NE, Section 12-20-2w, McPherson County, made 1,332 bbls. in 18 hours, 22 per cent water. The top of the chat was found at 2,930 feet, the pay at 2,979-81½ feet.

OKLAHOMA

The Sinclair Oil & Gas Co.'s No. 3 Stamper, SE cor. NW, Section 30-11-2w, is on fire. It is estimated to be making 100,000,000 feet of gas and 150 bbls. of oil an hour at the total depth of 6,555 feet. This well offsets the Shell Petroleum Corp.'s No. 2 Petty, which is shut down at 6,680 feet, with water in the hole. Same company's No. 2 Stamper, SW cor. NW, Section 30-11-2w, made 380 bbls. from the total depth of 6,420 feet. It was shut in at 7:30 a. m., October 8.

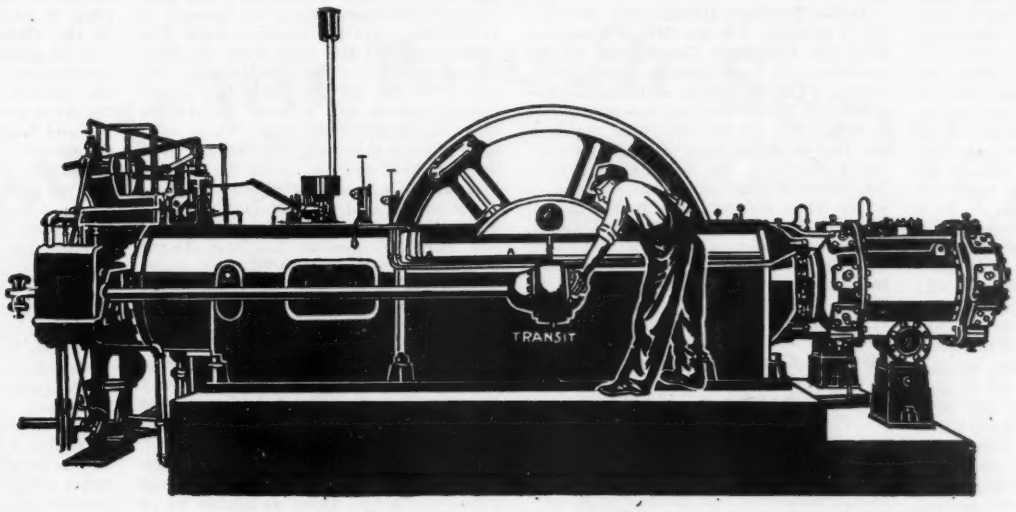
Mid-Kansas Oil & Gas Co. and Ramsey Petroleum Corp.'s No. 1 Trosper, NE cor. NW, Section 19-12-1w, Oklahoma County, made 294 bbls. on the gauge of October 8, at 7 a. m. It was shot with 2 quarts on Monday, October 7, and will be shot again Tuesday with 4 quarts.

Prairie Oil & Gas Co. and others' No. 1 Sudik, C NE NE, Section 8-10-2w, Cleveland County, drilled the plug and was rotating ahead at 7,177 feet.

Sinclair Oil & Gas Co.'s No. 1 Smith, SW cor. NW NW, Section 9-8-5, Seminole County, Maud Pool, made 345 bbls. from the Misener sand at 4,006-32 feet

(Continued on Page 236)

TRANSIT



TRANSIT 17x24″, Twin, Model 26, 170 H.P., 180 R.P.M., Gas Engine with compressors.

Here *is* Something:

Confirming by test a well-established fact, Messrs. George A. Goodenough and John B. Baker in their scientific paper, "A Thermodynamic Analysis of Internal-Combustion Engine Cycles," Bulletin 160 of the University of Illinois state that "a lean mixture gives a higher efficiency than a rich mixture."

The difficulty with gas engines has been to cut the gas down to the last notch without backfiring.

Here is an engine with a mixing arrangement that will enable you to adjust the mixture so lean that the explosion pressure is no higher than the compression pressure—and the engine will then burn the mixture without backfiring.

This Means Economy.

Agents

FRICK-REID SUPPLY CORPORATION
Tulsa, Okla., or any store.

REPUBLIC SUPPLY COMPANY
of California
Los Angeles, California

E. L. WILSON HARDWARE CO.
Beaumont, Texas.

NATIONAL TRANSIT
Pump & Machine Co.
Oil City, Pa.

DISTRICT OFFICES

NEW YORK PHILADELPHIA PITTSBURGH
CLEVELAND HOUSTON TULSA LOS ANGELES

Agents

F. C. RICHMOND MACHINERY CO.
Salt Lake City, Utah.

REEVES & SKINNER MACHINERY CO.
St. Louis, Mo.

Oklahoma City Wide Open October 12

Slick's No. 1 Glidden Makes 980 Bbls. in Hour With 50,000,000 Feet of Gas. Second Wilcox Well, Payne County, Indicates Good Pool

By W. A. Spinney
Staff Correspondent, Oklahoma Fields

Tom Slick Oil Co.'s No. 1 Glidden is the largest well completed in the Oklahoma City Pool to date. It blew in Saturday morning, October 5, making 945 bbls. the first hour, and made as high as 980 bbls. in one hour. The gauge for the first 5½ hours was 4,725 bbls. It was then shut in as all the available storage on the lease was full. It was also estimated to be making 50,000,000 feet of gas. The total depth of the well is 6,535 feet. It is located in the SW cor. SE, Section 13-11-3w.

The second well to blow in over the week-end was the Sinclair Oil & Gas Co.'s No. 2 Stamper, SW cor. NW, Section 30-11-2w. It is estimated to be making 40,000 000 feet of gas from the total depth of 6,420 feet. Same company's No. 1 Stamper, NE cor. SW NW, Section 30-11-2w, made 4,635 bbls. of oil and 5,000 bbls. of water on the gauge of October 4, at 7 a.m. All wells in the pool making water are allowed to be produced once a week, during the shut-in period.

The shut-in plan that has been in operation in the Oklahoma City Field for the past 30 days will be lifted on October 12. Under the new plan the production in the field will be allowed to flow wide open until November 1. It will then be prorated 40 per cent during November and 50 per cent during December. This new plan has been recommended and will in turn be submitted to the Oklahoma Corporation Commission.

The production is expected to increase in the Oklahoma City Pool soon after the first plan is lifted. Ten of the tests are within a few feet of where the oil production has been found in other producing wells. Some estimate the production of the field will reach 96,000 bbls. by November 1. Other tests have found water in the lime on locations that were considered to be proven.

Oklahoma County Wildcat

A wildcat test, 6 miles north of the main pool has cemented its final string of casing. Magnolia Petroleum Co.'s No. 1 Noble. NW cor. SW SW, Section 30-12-2w, Oklahoma County, east of the capitol, has located the source of water which has interfered with the bailing and pumping in of the cement. A hole at 2,890 feet was found in the casing which was finally closed and the water shut off. The test was shut down for a week for the cement to harden. It had a rainbow show of oil and a small amount of gas was noticed. The total depth is 6,362 feet.

Tom Slick Oil Co.'s No. 1 Martin, NW cor., Section 13-13-1w, Oklahoma County, had a showing of salt water at a total depth of 5,640 feet. This wildcat has been attracting a lot of attention and many expect it to make a producer. The test is caving and rotary tools will be moved in so drilling operations can be resumed. Same company's No. 2 Glidden, SE cor. SW SE, Section 13-11-3w, is shut down waiting on cement to set at a total depth of 6,505 feet. Bailing and drilling will be started the first part of the week at this test. This test is in what is considered proven area. Large wells are producing on practically all sides.

Sinclair Oil & Gas Co.'s Nos. 2 and 3 Stamper are expected to start drilling the plugs the first part of the week. No. 2 is located in the SW cor. NW Section 30-11-2w, Oklahoma County, and is waiting for cement to harden at 6,420 feet. No. 3 Stamper, in the same section, located in the SE cor. NW, is bottomed at 6,555 feet.

Indian Territory Illuminating Oil Co.'s No. 1 Watters, NE cor. NW NE Section 25-11-3w, Oklahoma County, the former gasoline well, was showing water while bailing. The fluid was standing around 5,300 feet in the hole, of which 300 feet is believed to be oil. The total depth of the test is 6,593 feet. Same company's No. 1 Foster, C NE SW Section 24-11-3w, made 27 bbls. of oil and 48 bbls. of water while fishing for a bailer on October 4. Same company's No. 1 Johnson, NE cor. NW Section 25-11-3w, will knock out the bottom of the sand screen and bail the hole. A production test will be made.

Prairie Oil & Gas Co. and others' No. 1 Sudik, C NE NE Section 8-10-2w, Cleveland County, is fishing for a bailer at a total depth of 7,175 feet, after landing 4¾-inch casing at 7,135 feet.

Logan County Proration

Logan County is under consideration at this time as being one of the areas that is contributing flush oil. The committee has recommended that production be curtailed 20 per cent in November and 25 per cent in December. The total production of the county for the week ending September 30 was 118,847 bbls. Of this amount, the Shell Petroleum Corp. produced 81,689 bbls. This is an increase of 17,794 bbls. over the previous week. The wells completed last week were the Shell Petroleum Corp.'s No. 10 McCully, NE cor. NW SE Section 30-19-4w, Logan County, which had sand at 5,890-6,010 feet and flowed 1,890 bbls. Same company's No. 6 Sebronek, SE cor. SW NW Section 30-19-4w, had sand at 6,012-22 feet, where it flowed 2,300 bbls. the first day's gauge, and is now making 1,380 bbls. Wentz Oil Corp.'s No. 2 Williams, NW cor. NE Section 31-19-4w, Logan County, was drilled to 5,855 feet, where an increase of gas blew the tools up the hole and a fishing job developed. Oil is slopping over the hole at the rate of 10 to 15 bbls. an hour. J. S. Cosden, Inc., No. 1 Gardner is still producing around 3 440 bbls. daily. The same company has tests Nos. 2, 3 and 4 drilling on the same lease.

Flush Pool Proration

A committee of oil operators representing several major oil companies and independents has drawn up a plan which will be presented to the Mid-Continent Oil & Gas Association at its meeting this week. Curtailment of production as high as 50 per cent in all the flush pools in the State has been recommended. The plan, if adopted, will later be submitted to the Oklahoma Corporation Commission for enforcement. It recommends that proration of production be applied to all the various pools in the Seminole area, the Allen Pool, Sasakwa, St. Louis, Pearson and Logan County Fields, as well as Oklahoma City Pool and East Earlsboro extension.

It is estimated the State's production would average 800,000 bbls. daily during the period from October 5 to December 31 unless restrictions were applied. It is necessary to curtail 140,000 bbls. daily if serious overproduction is to be avoided. Under the plan, it is suggested that Oklahoma City Pool be permitted to flow wide open from October 12 to October 31, inclusive, then be prorated 40 per cent in November and 50 per cent during December. East Earlsboro extension would remain curtailed 50 per cent to November 1, 40 per cent in November and 50 per cent during December. All other fields affected under the plan would be prorated 20 per cent from October 15 to November 30, and 25 per cent in December.

With this proration the committee estimates Oklahoma's production would average 660,000 bbls. daily from October 12 to January 1, 1930. The Oklahoma City curtailment plan, which is a 30-day complete shut-down, expires October 12.

Greater Seminole Production

The daily average production for the various pools in the Greater Seminole area shows a decline this week, the first in several weeks. It amounts to 10,892 bbls. The gauges for the week ending October 2 are as follows:

Pool—	Wells	Bbls.
Little River	375	82,117
Carr City	57	10,689
Maud	130	10,858
Mission	113	23,273
Bowlegs	295	31,318
Earlsboro	331	102,574
Seminole	272	32,181
East Seminole	26	7,956
Searight	83	10,946
St. Louis	426	61,017
Asher	20	7,513
Sasakwa	21	10,034
Allen	225	24,526
Total	2,374	415,002

The operators in the East Earlsboro Pool have curtailed their production this week and it will be well within the proration allowance. The daily average for the preceding week was 52,227 bbls. For the week ending October 5 it was 2,293 bbls.

East Little River Pools

East Little River Pool had one new well last week. Sinclair Oil & Gas Co.'s No. 5 Phillips, SE cor. NE SE, Section 5-7-7, Seminole County, swabbed 550 bbls. in 13 hours, from the Wilcox sand at 4,153-71 feet. The balance of the production in the pool has declined, and it averages 28 393 bbls., a decrease of 2,532 bbls., for the week ending October 3.

Maud Pool had no new wells. The McMan Oil Co. and White Eagle Oil & Refining Co.'s No. 2 Roberts brought the daily average production for the pool up to 10,858 bbls. for the week ending October 3, an increase of 500 bbls. over the previous week. Two tests expected to be completed in a few days are the Gypsy Oil Co.'s No. 2 Gossland, SW cor. NW SW, Section 9-8-5, Pottawatomie County, and Wilcox Oil & Gas Co.'s No. 8 Smith, SE cor. NE SE, Section 8-8-5, Pottawatomie County, both offsetting good wells and expected to make good producers.

The daily average production for the St. Louis Pool, was 61,017 bbls. for the

(Continued on Page 214)

WILDCAT OPERATIONS IN OKLAHOMA

(Descriptions are East and North unless marked otherwise)

NORTHERN OKLAHOMA

ALFALFA COUNTY

Company, farm and location—	Remarks:
Smith Bros.' No. 1 Forbes, SE cor. NW NW Sec. 12-27-11w	Shut down 1,232 ft.
J. W. Bailey's No. 1 Acre, SW cor. NE Sec. 14-24-11w	Drlg. 1,700 ft.

BECKHAM COUNTY

Kay and others' No. 1 Martin, C E half E half NW Sec. 32-8-24w	Drlg. 1,630 ft.
Producers Exploration Co.'s No. 1 Seidell, SE cor. SW SW Sec. 17-9-22w	Shut down 2,402 ft.
Carson and others' No. 1 Danby, SW cor. SE NE Sec. 20-8-22w	Shut down 1,547 ft.

BLAINE COUNTY

Lowen and others' No. 1 Unknown, NW cor. SW NW Sec. 27-16-11w	Spudded and shut down
Washoma Oil Co. and others' No. 1 Phillips, C NW SW Sec. 13-19-10w	Shut down 2,880 ft.

CADDO COUNTY

Abernathy & Brown's No. 1 Horton, SE cor. Sec. 8-6-13w	Shut down 535 ft.
W. J. Hartley's No. 1 Galbreath, SE cor. NW SE Sec. 29-5-12w	Shut down 3,394 ft.

CLEVELAND COUNTY

Harris et al's No. 1 Highbee, SE NW Sec. 20-6-1	Rig.
Daniels & LeWright's No. 1 Vandever, C SW Sec. 15-7-1w	Shut down 3,130 ft.
Phillips Pet. and T. B. Slick's No. 1 Sudick, NE cor. NE Sec. 8-10-2w	Drlg. 7,180 ft.; 4¾-in. csg. at 7,135 ft.

COAL COUNTY

J. S. Cosden's No. 1 Richardson, C NW NE NE Sec. 6-2-8	Drlg. 3,095 ft.
W. E. McGraw's No. 1 King, C SW NE Sec. 11-1-8e	Shut down 1,285 ft.
McGinley & Sigler's No. 1 Willsey, NW cor. SE SE Sec. 7-2-8	Shut down 3,016 ft.
E. W. Whitney's No. 1 Brown, C SE NE Sec. 10-2-8	Shut down 202 ft.

COMANCHE COUNTY

Green and others' No. 1 Wilson, C NE SW Sec. 14-1-12w	Shut down 4,055 ft.

GARFIELD COUNTY

E. L. Love and others' No. 1 White, SE cor. NW Sec. 9-24-6w	Underreaming 5-in. csg. 5,566 ft.

GRADY COUNTY

J. V. Bailey's No. 1 Hubbard, C NE NW Sec. 1-10-6w	Spudded and shut down
J. M. Henry and others' No. 1 Abraham, SE cor. NW Sec. 4-5-8w	Rig.

GRANT COUNTY

Gypsy Oil Co.'s No. 1 Belderbeck, C SE SE Sec. 27-28-7w	Spudding.
Bailey's No. 1 Stover, C SW SE Sec. 20-27-5w	Rig [illegible] ground
Baucher et al's No. 1 Deadman, SW SE Sec. 12-28-4w	Drlg. 3,135 ft.
Cowden and others' No. 2 Vollmer, CEL NE SW Sec. 22-25-4w	Shut down 5,640 ft.
Ostot's No. 1 Tabor, C NE NE SE Sec. 23-26-3w	Location.

GREER COUNTY

Helmerick & Payne's No. 1 Henck, NW cor. Sec. 23-6-24w	Drlg. 1,600 ft.
I. T. I. O. and others' No. 1 fee, C SW NE Sec. 17-6-24w	Fishing csg. 1,902 ft.
S. M. Stauffer's No. 1 Castleman, SW NE Sec. 8-4-26w	Shut down 825 ft.

HARPER COUNTY

Sinclair Oil & Gas Co.'s No. 1 Howell, C SW SW Sec. 14-26-24w	Drlg. 5,210 ft.

HASKELL COUNTY

Holden's No. 1 Phillip, SE cor. Sec. 3-9-18e	Shut down 1,200 ft.
Marion Oil's No. 1 Sanders, NW NE SW Sec. 10-9-18e	Shut down 2,387 ft.
Sanboise Gas' No. 1 Unknown, SW NW SE Sec. 32-9-21e	Shut down 2,100 ft.

HUGHES COUNTY

Wright et al's No. 1 Ott, SE SW Sec. 15-5-11	Rig.
Canady et al's No. 1 Kanard, NW SW Sec. 29-9-12	Shut down 1,200 ft.
Irwin et al's No. 1 Jones, SE NW Sec. 30-5-10	Rig up [illegible]
McCullouch Oil Co.'s No. 1 Scott, NW NE Sec. 23-6 8	Drlg. 2,570 ft.
Whitney et al's No. 1 Moore, SE SW Sec. 17-5-9	[illegible] 4,930 ft.

(Continued on Page 252)

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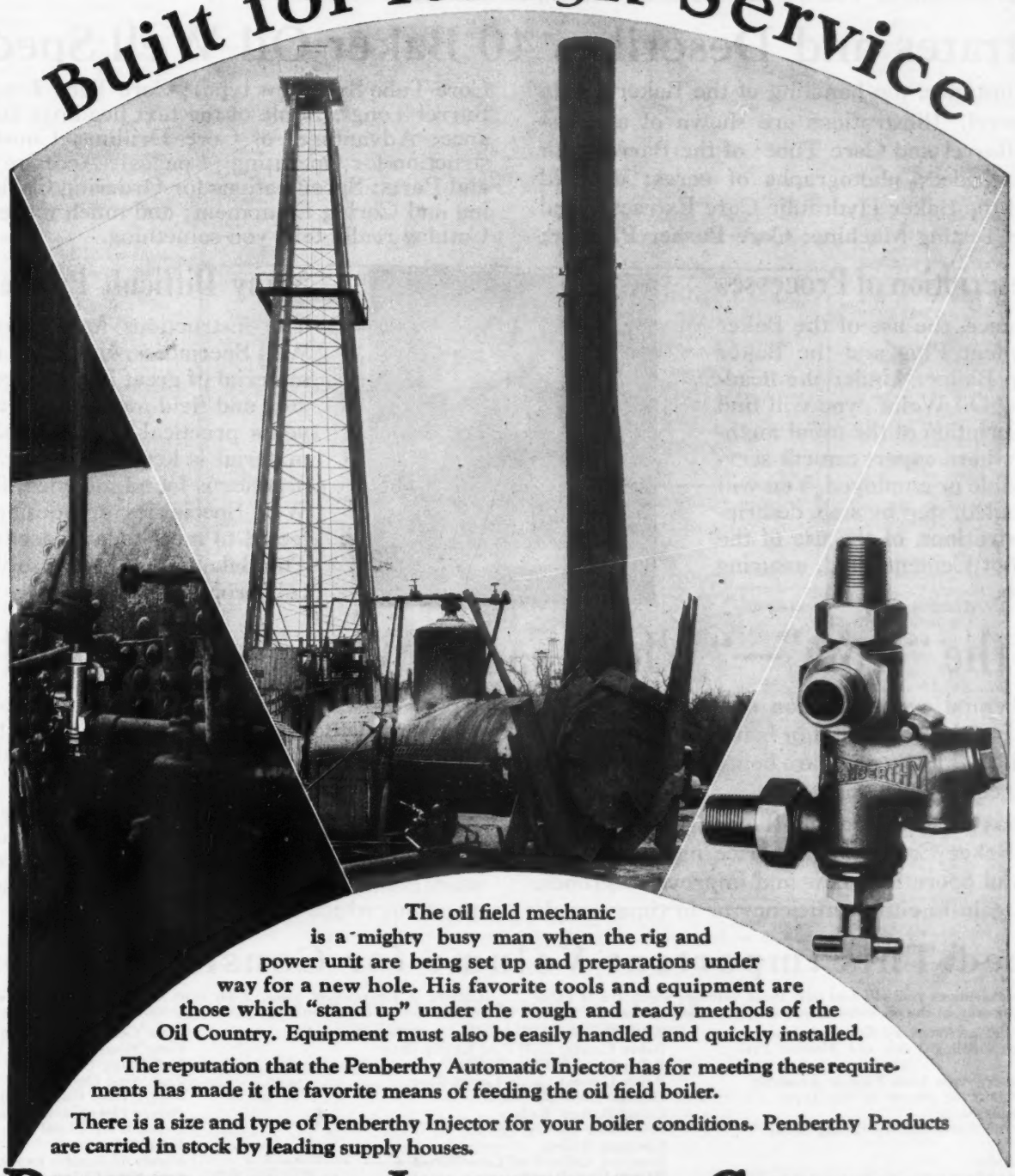

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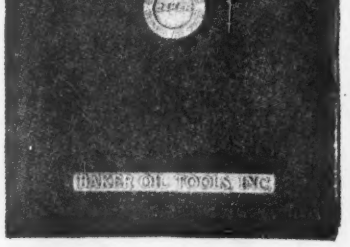

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Cement Dump Bailers
Cement Plugs, Sure-Shot
Cement Retainers, Model B
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Baker-Burch Side Hole Cement Float Shoe
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Baker Cement Bull Plug Casing Shoe
Baker Cement Float Collar
Baker Cement Guide Casing Shoe
Cement Hook-Up No. 1
Chisel Bottom Bailers
Saw-Tooth Bottom Bailers
Cleanout Bailers
Standard Cable Tool Core Barrel
Rotary Core Barrel
Hydraulic Core Extractor and High-Pressure Testing Machine
Tongs for Cable Tool Core Barrel
Drill Pipo Floats
Float Collars (Cast Iron Valve)
Float Shoes (Cast Iron Valve)
Bull Plugs, Cast Iron
Plain Shoe Guides, Cast Iron
Rotary Hole Guides, Screw Type
Rotary Hole Guides, Slip Type
Pitmans, All Metal
Rotary Shoes
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Production in Kansas to Show Decline

Proration Plan Adopted for 30 Days by Operators of Valley Center Pool Will Cut Output from 29,000 Bbls. to 15,000

By W. A. Spinney
Staff Correspondent, Kansas Fields

Production in Kansas will show a sharp decline under the proration plan adopted by the operators. Production for the week ending October 5 was 124,000 bbls. daily for the State. This will be reduced about 15,000 bbls. daily next week, most of the reduction will be in the Valley Center Pool, in Sedgwick County.

The shutdown plan adopted by the oil operators of the Valley Center Pool September 30 was put in operation on October 5. The production of this area was approximately 29,000 bbls. daily for the 10 days prior to the time the plan was effective. The State's production has been around 127,000 bbls. daily. The pipe line companies estimate that the production exceeds the demand by approximately 15,000 bbls. daily.

The area covered by the curtailment plan embraces Sections 36-25-1w and 1 and 12-26-1w, 6 and 7-26-1e in Sedgwick County. It will be for a period of 30 days from 7 a. m., October 5. The production will be restricted to 50 per cent of its potential total, but is not to exceed a daily average for the period of 15,000 bbls.

The daily average production of the area for the last 10 days of September is taken as the potential production for the first 10-day period of the plan. The umpire, T. C. Johnson, will ascertain the production of each lease and will allot each lease its allowable production. The time of proration is divided into three 10-day periods. The umpire at the beginning of each 10-day period will ascertain the potential, basing it upon the production from new wells completed during the preceding 10 days.

Each operator will restrict the oil production on his lease to the total amount allotted to it by the umpire during each 10-day period. If the production exceeds the allotted quota during the 10-day period, such excess production will be deducted during the following 10-day period.

Operators Committee in Charge

The following operators were elected as members of the operators committee: S. W. Herndon, Bu-Vi-Bar Petroleum Corp.; James Davis, independent operator; W. F. Skaer, independent operator. The operators committee will have full power to adjust all disputes that may arise to make the application of the plan fair.

The umpire is authorized to employ gaugers, and other necessary assistants. The second meeting will be held in Wichita, Wednesday, October 30, for further discussion in regard to continuing the plan.

Five drilling tests in the proration area are expected to reach the pay horizon in the next few days. Bu-Vi-Bar and others' No. 1 Childs, in Section 7-26-1, was drilling at 3,287 feet. J. S. Cosden, Inc.'s No. 1 Deweese, Section 1-26-1w, which is seeking an extension to the west of the pool, was drilling at 3,175 feet. Wentz Oil Corp.'s No. 3 Bright in Section 1-26-1w, was drilling at 3,340 feet. The same company's No. 4 Bright, same section, was drilling at 3,100 feet.

The shutdown plan in the Valley Center Pool is the first of its kind in the oil history of Kansas. The discovery well in that pool was drilled on the Wright lease and was completed in August, 1928. The approximate total recovery from the pool has been 6,137,801 bbls. including the gauge of October 4, at 7 a.m.

Production by Companies

The following table shows the recovery by companies and leases:

Company, farm—	Wells	Bbls.
Aladdin:		
Benningfield	3	98,342
Allison et al:		
Kelly	1	860
Bu-Vi-Bar et al:		
Branch	2	175,505
Bright "A"	2	37,755
Bright "B"	5	298,221
Byers	1	33,518
Corr	8	445,824
Emerich	2	158,311
Goodrich	5	119,476
Lantz	3	141,757
Lyon	3	663,030
Hiles	1	2,959
Reed	4	177,311
Rothfuss	1	790
Roll	1	75,690
Shawver	9	912,501
Woodward	1	36,181
Wright	8	1,027,362
Davis and Skelly:		
Wilson	13	479,045
Derby:		
Bowling	1	25,646
Gorman	4	184,789
Mary Jane:		
Fitch	2	201,330
Montour:		
Lavender	2	212,979
Patton:		
Swenson	1	17,410
Phillips Pet.:		
Difford	3	40,387
Peifer	1	25,027
Reynolds:		
Roll	1	106,712
Richards et al:		
Townsite	1	215
Robertson:		
Creason	1	76,245
Stearns:		
Roll	1	113,704
Tidal:		
Scherger	3	116,001
Vickers:		
Nessen	3	82,991
Wentz:		
Bright	2	19,912
White Eagle:		
Baylor	1	4,199
Total	100	6,137,801

Campaign Pending in McPherson

The lime pay horizons in McPherson County are due for a development campaign in the next few months. The area around the gas production in that county has long been attractive to the oil operator and it is now being tested. The third oil pool in the county may be opened by the Derby Oil Co.'s No. 1 Stuckey, NE cor. SE Section 9-21-3w. It is a half mile south of the discovery well, which was drilled by Ted Washabaugh. The Derby Oil Co.'s well had the pay at 3,285-88 feet, where it filled up with oil. This test found the pay horizon 17 feet higher than the discovery well and it indicates the possibility of a pool in this part of the county. Ted Washabaugh's No. 1 Voshnel, in the same section, recently sold after several months of trying to clean up a fishing job of collapsed casing, was estimated to be a 300-bbl. well at the time it reached the pay horizon at 3,302-04 feet. It is still making about 35 bbls. daily through several hundred feet of cavings. This pool is 12 miles southwest of the new wells the Shell Petroleum Corp. found on the Rietz farm in Section 1-20-2w, McPherson County, which are producing from the chat, at 2,900 feet.

In the Winfield Pool, east of that city in Cowley County, the Prairie Oil & Gas Co. and others' No. 1 Zeien, SW cor. NE NW Section 19-32-5, filled up with oil in 30 minutes and it was expected to flow later. The test found oil in the Bartlesville sand at 3,040-56 feet. This well extends production in the pool two locations east.

Leasing Play Under Way

A leasing play is under way in Coffey and northern Woodson Counties, as the result of the oil find of Ellis & Huff's No. 1 Scott, NW cor. SW Section 13-23-14, Coffey County. The oil was encountered at 1,612-23 feet, after a 60-quart shot which knocked a joint of casing loose. The test was estimated to be a 50 to 75-bbl. well. This test is a few miles north of the old Allen Pool.

Allison & Fitzwilliam's No. 1 Morris, NW cor. SE SE Section 9-30-12w, Barber County, is a failure in the Wilcox sand. The test had the top of the lime at 4,585 feet. The Wilcox sand was found at 4,652-58 feet, with a hole full of water. The well will be abandoned.

Two new locations were made in Stevens County last week. One was Argus Oil Co.'s No. 1 in the C SE Section 17-32-37w, 6 miles north of Hugoton. The other was made by Mangle and others' No. 1 in the C SE NW Section 24-32-39w on the extreme west side of the county.

A new oil test regarded by many operators as one of the important ones in Sedgwick County, has been made by Don More and the Alco Royalty Co. It is expected to be the opening of a new pool in this part of the county, and will be spudded in immediately. The test is No. 1 Schulte, NE cor. SE NW Section 18-28-1w, in the southeastern part of the County. The test is on a structure which has been core-drilled by several major oil companies. These companies and many others have long looked upon this as one of the possible oil-producing areas of the county. Shell Petroleum Corp. and Continental Oil Co. drilled a test well several years ago in Section 5-28-1w, which had a showing of oil and later was abandoned. The same companies are expected to drill another test well in Section 7-28-1w in the near future. Exact location has not been made.

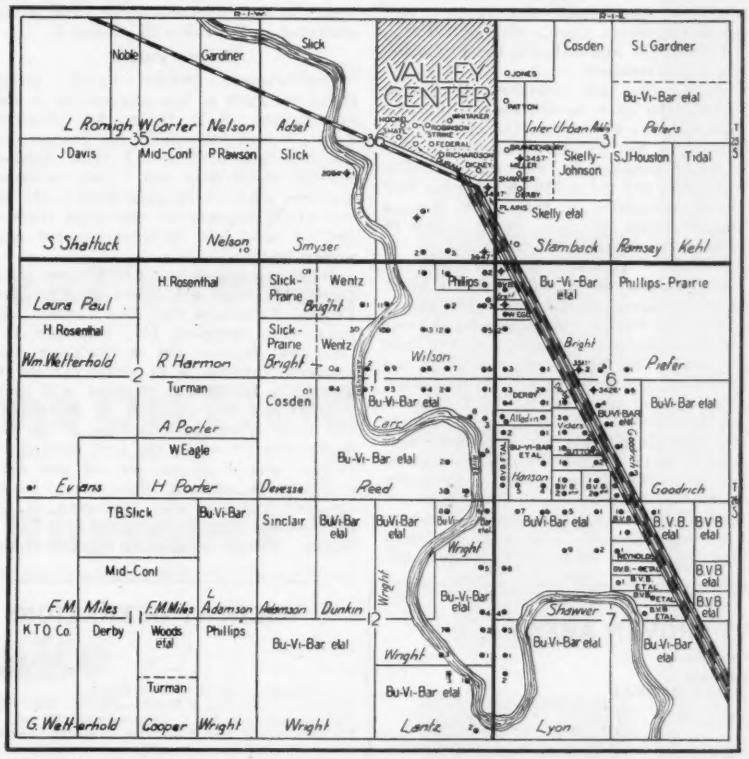
McPherson County

W. C. McBride Inc. has the rig on the ground for No. 2 Voshell, SE cor. NE NE, Section 9-21-3w.

Ellis County

Davis, Hazlett and others' No. 4 Weiland, SW cor. NE NE, Section 1-13-16w,

(Continued on Page 208)



The Valley Center Pool shown in the above plat has been producing the majority of flush oil in Sedgwick County. It has been prorated 50 per cent by its operators for a 30-day period, effective October 5.

WILDCAT OPERATIONS IN KANSAS

(Descriptions are East unless otherwise marked)

BARBER COUNTY

Company, farm and location—	Remarks.
Rolland & Skelly Oil Co.'s No. 1 Pickens, C NE NW NE Sec. 27-30-14w	Plug back to 4,727-30 ft. to test; Total depth 4,735 ft.
Skelly Oil Co.'s No. 1 Temple Ranch, Sec. 13-34-15w	Underreaming 8-in. csg. 4,045 ft.
Robertson et al's No. 1 Powell, SE cor. SE Sec. 11-32-10w	Drlg. 3,260 ft.
Allison & Fitzwilliams' No. 1 Morrisse, C NW SE SE Sec. 9-30-12w	Drlg. 4,400 ft.

BARTON COUNTY

Allison & Fitzwilliams' No. 1 Unknown, NE cor. Sec. 19-16-12w	Rig.
Slick et al's No. 1 Sweeney, SW NE Sec. 23-17-11w	Drlg. 250 ft.
Everett & Wiley's No. 1 Ward, NW cor. SW Sec. 13-20-13w	Shut down 3,948 ft

BUTLER COUNTY

Martin et al's No. 1 Flanigan, C SW SE SW Sec. 29-27-3	Rig.
Travis et al's No. 1 Harrison, SE cor. Sec. 21-25-3	Drlg. 3,145 ft.
Milmac Oil Co.'s No. 1 Clearwater, SW cor. Sec. 33-25-3	Drlg. 2,750 ft.
Lario Oil & Gas' No. 1 Gordon, NW cor. Sec. 15-26-3	Underreaming 3,250 ft.
Sinclair Oil & Gas' No. 1 Johnson, NE cor. Sec. 16-26-3	Drlg. 1,882 ft.
White Eagle's No. 1 Bachelder, SW cor. Sec. 17-25-3e	Drlg. 2,905 ft.

CLAY COUNTY

Derby Oil Co.'s No. 1 Meimueller C NW SW Sec. 9-10-3e	Drlg. 2,100 ft.

COWLEY COUNTY

A. M. Landon's No. 1 Wheeler, C SW NW SE Sec. 24-30-4	Rig.
J. B. Markley's No. 1 Tatum, SE cor. SW Sec. 11-31-6	Shut down 500 ft.
Shawver et al's No. 1 Oldham, NW SE Sec. 23-33-3	Drlg. 1,500 ft.

(Continued on Page 276)

Two Dixie Pool Offsets Bailed Dry

Six New Tests Under Way in That Tricky Caddo Area. Increasing Amount of Shallow Sand Work in Northeast Smackover

By D. H. Bancroft
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., Oct. 7.—The uncertainties of the Dixie district were given another demonstration this week when two offsets to the four recent big performers in the northeast extension of this tricky Caddo Pool bailed dry where there was every reason to expect production. One of these, No. 2 School in the NW cor., Section 19-17-14, is an east offset and the other, No. 3 on the same lease, is on the south. No. 2 was dry at 2,441 feet and is drilling shale at 2,483 feet and No. 3 duplicated it at the same depth and also will go deeper. However, six new jobs in the vicinity got under way. Ohio Oil Co.'s No. 4 Hunter, Section 19-17-14, derrick; No. 2 began drilling and is well along. Standard Oil Co. began drilling No. 9 Hunter in Section 8-19-14, and The Texas Company is rigging up on No. 4 Hunter in the same section and has derrick up for No. 5. S. D. Onyett and others' No. 1 Dickson, in Section 10-19-14, about a mile northeast, is drilling in and is regarded as a good bet. Gulf Refining Co.'s No. 5 Oden, in Section 18-19-14, bailed 3 bbls. oil and much salt water from 2,439 feet after plugging back from 2,454 feet where it ran into water. Ray-Dawes Drilling Co.'s No. 3 Hunter in Section 9-19-14, where they completed the second big producer in the pool, was completed at 2,440 feet flowing 100 bbls. through tubing.

Shallow Smackover Work

Dixie district shared attention during the week with the increasing amount of shallow sand work going on in the northeast corner of Smackover in Union and Ouachita Counties. Just now there are 14 such jobs under way, some from the grass roots down, others plugging and perforating old deep sand wells that have played out. Four such were completed during the week; Magna Production Co.'s No. 7-B Linahan, Section 36-15-16, pumping 35 bbls., 35 per cent water, from 1,999 feet; Skelly Oil Co.'s No. 3 Woods, Section 34-15-15, pumping 700 bbls., 50 per cent water, from 2,004 feet; Standard Oil Co.'s No. 12 Arnold, Section 26-15-16, pumping 40 bbls. oil from 2 052 feet and A. H. Ramage's No. 10-A James, Section 6-16-15, Union County, pumping 45 bbls., 50 per cent water, from 1,984 feet. E. M. Jones decided not to drill No. 1-C Allen in Section 25-15-18, Mount Holly district, and abandoned the location. Along with the new work in Smackover there is quite a bit of trading going on, Skelly Oil Co., in one trade paying $25 an acre for the SW SE, Section 26-15-15. In Union Parish, Shell Petroleum Corp. is rigging up to drill No. 1 Carroll in Section 19-18-16, a joint test on an old block in the Wesson district in which Shell Petroleum Corp., Marine Oil Co., Tidal Oil Co. and Atlantic Oil Producing Co. are interested.

Seeing the luck operators are having in plugging back an old Smackover producer, Magna Production Co. plugged and perforated No. 1-C Rowland, Section 14-17-14, Champagnolle district, at 2,992-3,006 feet and got a 110-bbl. flowing well It was completed in July, 1928, flowing and swabbing 300 bbls. from 12 feet of sand, total depth 3,210 feet.

Bossier Parish

Collins and Nesbit have taken a block of 2,000 acres in Township 19, Range 13, Bossier Parish, across Red River from the Dixie district of Caddo, and will drill in Section 20, The Texas Company and Louisiana Oil Refining Co. having taken units in the proposition. S. I. Borden and Green Smitherman have taken over Nemours Corp.'s old No. 1 Kilgore, Section 31-23-11, Carterville district of Bossier. a 37,000,000-foot gasser at 3,062 feet in March, 1928, and will drill it to the 3,100-70-foot level where some production has been obtained. J. F. Palmer's No. 4 McCann, Section 31-16-11, Elm Grove district, which was scheduled to be deepened from 1,910 feet has been abandoned. Palmer Corp.'s No. 13-B Hodges, Section 25-16-12, was completed at 1,908 feet making 1,000,000 feet of gas.

Palmer Corp. and the Standard Oil Co. each have taken a one-third interest in Triangle Drilling Co.'s deep hole proposition, No. 1 Kilpatrick in Section 7-19-5, Claiborne Parish, 15 miles southeast of Homer, and the hole is to be taken to 5,500 or 6,000 feet. Meanwhile The Texas Company, Gulf Refining Co. and Dixie Oil Co. have bought scattered acreage strung along the edge of Homer production at $10 an acre. C. W. Cupp has bought 2,000 acres in the center of Township 23, Range 5, Claiborne Parish, adjoining the Slick block on the east and just south of the Coates and others' prospect at Junction City. Magnolia Petroleum Co. has approximately 1,000 acres scattered in Township 23, Range 6.

DeSoto Parish

Southwestern DeSoto Parish seems slated for more or less prospecting in the near future. S. D. Hunter has acquired a 75 per cent interest in the Benson Oil Co. and will drill No. 1 Hill, Section 4-10-13, for a deep test. Two or three previous wells at Bension have made oil and gas in commercial quantities from a shallow sand but the area has not had a deep test.

H. B. Langford has 6,000 acres solid except for some old leases held by the Federal Petroleum Co., The Texas Company, Gulf Refining Co., Standard Oil Co., and Shaffer Oil & Refining Co. scattered through it in small parcels in Township 11, Range 13, and will drill a 3,200-foot test, probably in Section 7. The tract is on the east edge of the old Spider district where the first drilling in DeSoto was done and an old gas well drilled by Benedum & Trees several years ago and which is still producing, is on the western edge of the tract.

Sam Hunter also is embarked on another deep test, No. 1 West Virginia Timber Co. in Section 25-18-5, Ouachita Parish, which he intends taking 5,500 feet. He has 1,200 acres centering around Section 25 and the well, half way between Monroe and Richland production, will be a highly interesting experiment. Bahan & Bahan have a block of 3,000 acres centering on Section 34-20-2, northwest of production, and will go 3,500 to 4,000 feet, but as the two previous deep holes in this vicinity did not test the Monroe gas rock but cased through it, they expect to get gas before reaching this depth. Mack & Pipes' No. 1 Schultz, Section 13-18-4, gauged 1,290,000 feet of gas at 800 pounds, total depth 2,223 feet.

Louisiana

Caddo, light	17,910
Caddo, heavy	3,195
Homer	3,795
Haynesville	4,900
DeSoto-Red River	3,185
Elm Grove	530
Bellevue	690
Cotton Valley	2,515
Urania	5,600
Pleasant Hill	1,000
Sarepta	350
Total	43,670

Arkansas

El Dorado	4,530
Smackover, light	5,795
Smackover, heavy	45,730
Stephens	1,000
Nevada County	990
Lisbon	1,235
Champagnolle	5,600
Bradley	85
Total	64,965
Both states	108,635
Last week	103,585
Increase	5,050

Richland Parish

The new territory along the northern extremity of Richland proven area adds 25,000,000 feet to the field's open flow capacity with three wells. W. C. Feazel's No. 1 Haynes & Vincent, Section 17-16-6, gauged 18,828,000 feet at 2,460 feet; Hope Production Co.'s No. 1 Boykin, Sec-

(Continued on Page 206)

LOUISIANA-ARKANSAS PROVEN AREAS

NORTH LOUISIANA

BOSSIER PARISH—CARTERVILLE

Company, farm and location—	Remarks:
Bahan & Bahan's No. 1 Kilgore, 1,310 ft. E, 675 ft. S, NW cor., Sec. 31-23-11	Completed as 37,700,000-ft. gas well at 3,062 ft. Apr. 27, 1928; taken over by Nemours Corp.; arranging to deepen.
Delaware-La. Dev. Co.'s No. 4 Bollinger, Sec. 38-23-11	Completed Sept. 18 flowing 100 bbls. by heads; T.D. 3,922 ft.

BOSSIER PARISH—BELLEVUE

H. L. Morgan et als' No. 1 Wetherbee, 200 ft. S, 200 ft. W, NE cor. SW SE, Sec. 21-19-11	S.D.; drlg. wtr. well; T.D. 1,300 ft.

BOSSIER PARISH—ELM GROVE

Ark.-La. P. L. Co.'s No. 6-B Van Hoose, 2,815 ft. S, 2,650 ft. W, NE cor., Sec. 36-16-12	Tested dry 1,894 and 1,900 ft; estimated 1,000,000 ft. gas 1,917 ft; arranging to deepen.
Jones Chemical Co.'s No. 3 fee, 400 ft. N, 400 ft. W, SE cor. NW NE, Sec. 32-16-11	Drlg. 3,060 ft.
La. G. & F. Co.'s No. 3 Skannal, 660 ft. N, 660 ft. W, SE cor. SE SE, Sec. 14-17-12	Began drlg. Sept. 26; cmtd. 12½-in. 120 f.; 8-in. 842 ft.
Palmer Corp.'s No. 1-A J. A. McDade, 2,310 ft. W, 660 ft. N, SE cor., Sec. 12-17-12	Location.

CADDO PARISH—MOORINGSPORT

C. B. Moore's No. 1 Buckalew, 2,000 ft. N, 1,000 f. W, SE cor., Sec. 30-20-15	Cmtd. 6-in. 2,171 ft; drlg. 2,190 ft.

CADDO PARISH—DIXIE

Gulf Ref. Co.'s No. 5 Oden, Sec. 18-19-14	Reported abd. S.W. 2,454 ft. in error; plugged back to 2,425 ft; bailed 3 bbls. oil; 600 bbls. S.W. 2,430 ft.
Gulf Ref. Co.'s No. 4 Hunter, 820 ft. S, 330 ft. W, NE cor., Sec. 17-19-14	Arranging to cmt. 6-in. 2,433 ft.
Gulf Ref. Co.'s No. 5 Hunter, 990 ft. W, 330 ft. S, NE cor., Sec. 17-19-14	Cmtd. 10-in. 108 ft; drlg. 2,412 ft.
Ohio Oil Co.'s No. 4 Hunter, 330 ft. N and W, SE cor. NW NE, Sec. 17-19-14	Derrick.
Ohio Oil Co.'s No. 6 Hunter, 330 ft. S, 330 ft. W, NE cor. NW NE, Sec. 17-19-14	Began drlg. Sept. 28; cmtd. 10-in. 112 ft; drlg. 850 f..
Palmer Corp.'s No. 1 Hunter, 330 ft. N, 330 ft. E, SW cor., Sec. 8-19-14	Completed July 21, 1929; produced 40 bbls. 2,401 ft; drlg. 2,428 ft.

(Continued on Page 211)

WILDCAT OPERATIONS IN LOUISIANA-ARKANSAS

NORTH LOUISIANA

BOSSIER PARISH

Company, farm and location—	Remarks:
Corbett et als' No. 1 Murff, SE cor. NE, Sec. 18-17-11	S. D. 990 ft.
Neil & Lanier's No. 1 Biedenharn, SE cor., Sec. 23-21-14	S.D. 790 ft.
Walker et als' No. 1 Antrim, NW cor. SE, Sec. 28-22-13	S.D. 3,021 ft.; made 57 ft. more hole; tested small show oil; arranging to deepen; T.D. 3,078 ft.
Woodmansee et als' No. 1 Bollinger, SE cor. NE, Sec. 9-22-11	S.D. waiting orders 3,532 ft.

CADDO PARISH

D. C. R. Oil Co.'s No. 2 Oden, 892 ft. W, 264 ft. S, NE cor. NE NW, Sec. 20-19-14	S.O.; tested dry 2,445 ft.; S.D.; W. O. 2,550 ft.
Haynes Bros.' No. 1 Oden, 1,650 ft. S., 330 ft. W, NE cor., Sec. 20-19-14	Drlg. shale and bldrs. 2,200 ft.
Lide et als' No. 1 Hunter, 300 ft. S, 200 ft. E, NW cor., Sec. 22-19-14	S.O. 2,442 ft; W.O.S.R.; 5½-ft. sand 2,460-65½ ft.; T.D. 2,468 ft.
Lide et als' No. 1 Levee Board, 200 ft. S, 200 ft. W, NE cor., Sec. 24-19-15	Reaming to bottom; T.D. 2,205 ft.
R. W. Norton's No. 1 Hill, 630 ft. N, 1,260 ft. W, SE cor. NE, Sec. 22-22-16	Drlg. 3,405 ft.
Old River Co.'s No. 1 Sibley, 300 ft. S, 300 ft. E, C, Sec. 15-19-14	Drlg. sand rock 1,820 ft.
S. T. Oynett, trustee's No. 1 Dixon, SW cor., Sec. 10-19-14	Cemented 6-in. 2,385 5ft,
I. N. Pharis, trustee's No. 1 Oden, NE cor. SE NE, Sec. 16-19-14	Drlg. shale 2,100 ft.
Standard Oil Co.'s No. 2 School Land, 330 ft. S, 330 ft. E, NW cor., Sec. 16-19-14	Tested dry; show oil and gas 2,441 ft.; drlg. 2,483 ft.
Standard Oil Co.'s No. 3 School, 990 ft. S, 330 ft. E, NW cor., Sec 16-19-14	Cemented 6-in. 2,380 ft.; showed oil, tested dry 2,440 ft; arranging to deepen.
Planters Oil Co.'s No. 1 Pittman, 200 ft. S, 200 ft. E, NW cor. NE, Sec. 23-19-14	Rig up.

CATAHOULA PARISH

Lochnager Pet. Co.'s No. 1 Taliaferro, 572 ft. E. 396 ft. S, C, Sec. 26-9-6	S.D. 900 ft.

CLAIBORNE PARISH

El Dorado Chief Oil Co.'s No. 1 Dance, C SW NE, Sec. 27-20-7	S.D. fuel; T.D. 1,500 ft.
Triangle Drlg. Co.'s No. 1 Kilpatrick, 660 ft. S, 660 ft. E, NW cor. SW NE, Sec. 7-19-5	Began drlg. Sept. 29; drlg. 170 ft

DESOTO PARISH

Benson Oil Co.'s No. 1 Hill, 1,8455 ft. S, 1,200 ft. W, NE cor., Sec. 4-10-13	Rigging up.

(Continued on Page 212)

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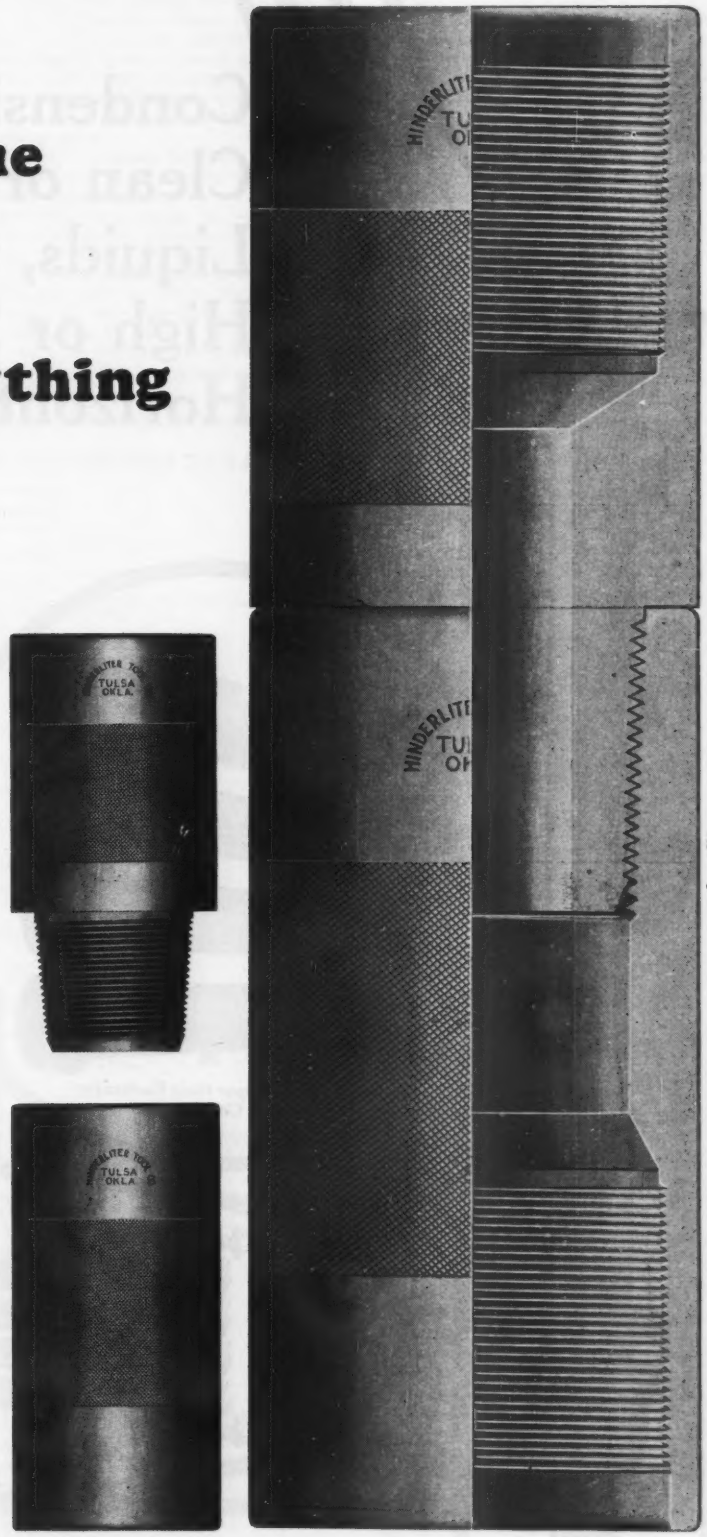

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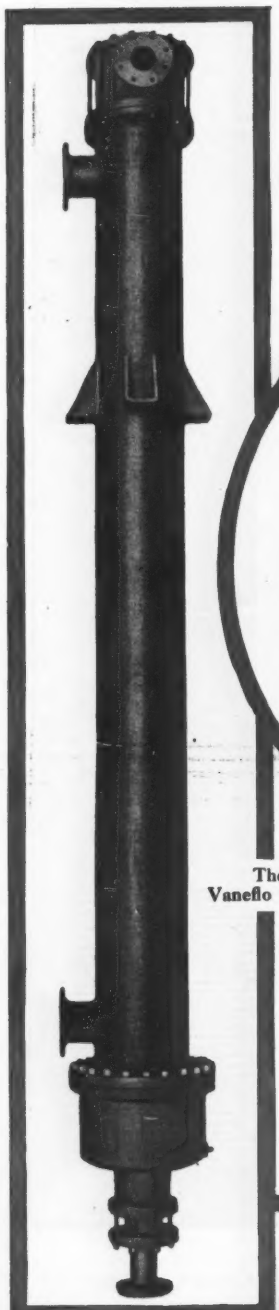

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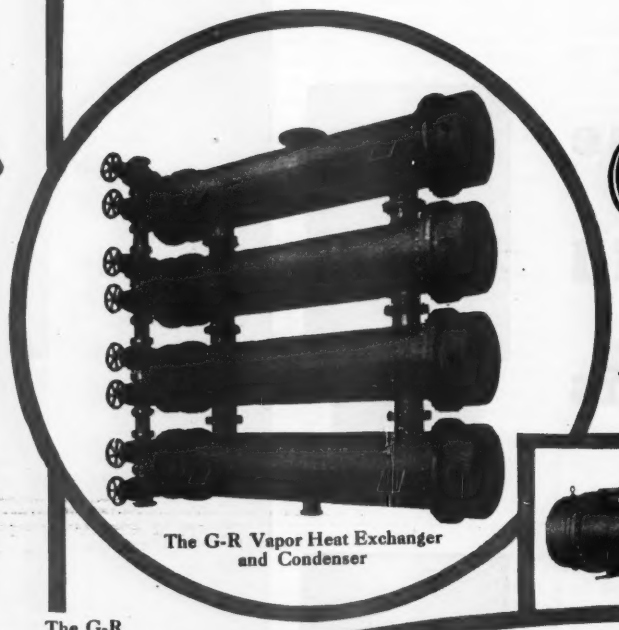

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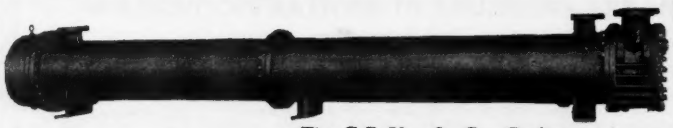

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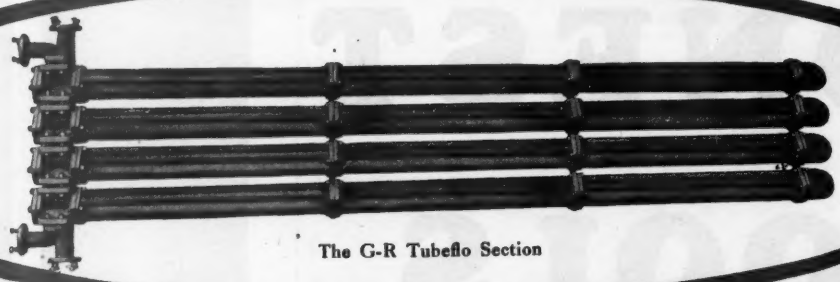

The G-R Tubeflo Section

The G-R Vaneflo Exchanger

Dry Offsets in Darst Creek District

Geologists Believe There Is Still Chance for Pool in That Area. Three Completions in Laredo Section

By B. D. Stevenson
Staff Correspondent, Southwest Texas Fields

SAN ANTONIO, Tex., Oct. 7.—Immediate danger of overproduction of crude petroleum from the Darst Creek area in Guadalupe County was removed the past week, for at least a time, when the Sun Oil Co.'s No. 1 Manford and the Simms Oil Co.-R. R. Penn's No. 2 Manford, offsets to the discovery, No. 1 Manford, were each abandoned dry at 2,951 feet for the first and 2,910 feet for the other. Also the Magnolia Petroleum Co.'s No. 1 Appling, southwest from the Manford propositions and in line with that and The Texas Company's two producers in the Darst Survey, late in the week was right at the point where it should pick up the chalk soon or else get it low and it was not yet in the chalk. The question is, what are they going to do next in the Darst Creek territory? The Simms Oil Co.-R. R. Penn's No. 1 Manford, changed from a quarter-inch to a five-eighths-inch choke increased its flow from around 300 bbls. up to about 1,000 bbls. a day. Its total depth is 2,418 feet. Elevation of both it and the two offsets is 442 feet. It was rather suspected a week ago that the two offsets to No. 1 Manford would be dry. One is an east offset and the other a north offset. However, there is still a chance there is an oil pool in that area. Geologists have figured it out on the "drag" theory that there is a possibility that by moving to the southeast production might be obtained. There is also a chance that production may be picked up northeast and southwest in the line of the trend of faults in that territory.

West of Darst Creek

West of the Darst Creek territory and half way to Seguin, T. H. Poole's (Eugene Sights) No. 1 Behring is twisted off at 2,233 feet. It was reported in The Oil and Gas Journal as looking a little high and favorable. It has made more hole and is still looking favorable, excepting for the fishing job. It topped the chalk at 1,983 feet with an elevation of 438 feet. Above the chalk was 30 feet of dry Serpentine and in the chalk 100 feet of formation with oil. Eagleford topped at 2,133 feet had oil in it. Total depth is 2,233 feet and the last 2 feet was Buda and it carried oil. The Pagenkoff-Kennon's No. 1 Halm reported last week to be northeast of this test and likely to be interesting on that account is not northeast but northwest and hence of no interest in connection with No. 1 Behring. Mistake in location was due to similarity in names of the survey, the well being in the Joseph Kent Survey instead of the James Kent Survey as first reported. Pagenkoff-Kennon's No. 1 Halm is now spudding in and the location is based on the fault line disclosed from chalk depths in old tests.

Pettus Area

New producing spots discovered elsewhere in Southwest Texas are still hanging fire a little also. In the Pettus area in Bee County, Mission Drilling Co. had to reset the casing in No. 4 Ray at 2,716 feet and was drilling out the plug, intending to bail. It first came in for 30,000,000 feet of gas but a little salt water broke in. No. 3 Ray, 3 miles east of Nos. 2 and 4, is around 4,700 feet and drilling. This hole made 5,000,000 feet of gas and sprayed 47 gravity oil at 4,062 feet.

Throughout Southwest Texas there are a number of deals that have either been consummated or are in process of being closed and among them the Shell deal in the Darst Creek territory. It was recently reported that the Shell Petroleum Corp. would drill about 3½ or 4 miles southeast of The Texas Company's discovery well in the Darst Creek Survey. Shell is now core drilling the block leased from the Denmann estate and the understanding is pay $40 an acre for 1,000 acres, probably about the highest price ever paid for purely unproved stuff. This acreage, it should be borne in mind, is southeast of The Texas Company's Darst Creek well and not in the trend since that field, if it goes anywhere, will go northeast and southwest. Shell is to core drill and then select a strip 3,500 feet wide down through the Denmann tract, the Denmann interests to retain one-third in alternating tracts, Shell to take 200 acres and Denmann the next 100 and so on down the length of the tract. This acreage lies adjoining the A. G. Keiffer lease block on which he has No. 1 A. B. Dix that around 1,400 feet showed quite a lot of gas and created considerable excitement. It is now down around 2,690 feet and shut down for a short time but likely to resume drilling soon.

Laredo District

There were three completions last week in the Laredo district, two of which were producers, each being in proven fields with nothing of unusual interest. Magnolia Petroleum Co.'s No. 2 Benavides, C SE SW of Survey 697, is a 30,000,000-foot gas well at 2,320 feet, in Webb County in the Mag-Cole Field. O. W. Killam's No. 16 Cuellar, in Zapata County, is a 30-bbl. well as 1,493 feet, the shallower of the two sands producing in that field.

Usher Carson abandoned at 2,535 feet his No. 2 Benavides in Survey 1,613 of Webb County north of the Reiser Field, a wildcat location.

Seven new locations were made in the Laredo district the past week but none had any unusual features. W. G. French has made the location for the seventh test in the southwest corner of Brooks County where he is drilling formation tests preparatory to making locations for some deep holes.

Carolina-Texas

Trapshooter Reilly Oil & Royalty Co. has purchased for a consideration of $500 per acre to be paid out of oil the lease on 40 acres in the southwest part of Survey 684 in the Carolina-Texas Pool in Webb County from the Gulf Production Co. The tract is the south half of the south half of the southwest quarter of Survey 684. It is immediately north of the lease he had already secured from the Gulf in Survey 685 and on which he has completed two wells at around 3,000 feet extending the field considerably to the south. His No. 2 Benavides, one of the two wells completed, made a flow of 100 bbls. in one night recently.

In the same field, Foster Barnsley, who has some production at 2,600 feet a half mile north of Trapshooter Reilly, has purchased the lease on 20 acres being the N half SE SW of Survey 684. There is a 20-acre tract between it and the purchase by Trapshooter Reilly.

Lease Deals

In addition to the Denmann lease in Guadalupe County purchased at a price of $40 an acre the Shell paid $50 an acre for a lease on 25 acres in the Ira Nash Survey and in the same territory, the purchase being the Riley Taylor farm, and paid $825 for the F. M. Roberts 75-acre tract. The Texas Company bought some acreage in that territory and paid around $20 an acre for it. This is unproven and wildcat acreage and indicates the interest in the Guadalupe territory.

In Wilson County, southwest of the Darst Creek Pool in Guadalupe and near where Rycade Oil Corp. made a recently important purchase from C. O. Maddox, the Arkansas Natural Gas Co. is understood to have closed a deal with Trinity Drillers of San Antonio for a half interest in a block of 3,500 acres for $25,000 and a test, the tentative location being south of Sutherland Springs in the A. Trevino Survey and on the W. E. Dawson 60-acre farm. A great deal of acreage has been blocked in that territory by big companies.

An important deal was consummated in Live Oak County. John T. O'Neil and J. Bland Catlett blocked 17,000 acres in Live Oak County 7 miles north of the Houston Oil Co.'s Cartwright gas field and will drill a 4,000-foot test, the location being 900 feet from the southwest line and 150 feet from the northwest line of the Mrs. A. Smith 401-acre tract, and 2 miles south of Bapara. R. L. Man-

(Continued on Page 206)

WILDCAT OPERATIONS IN SOUTHWEST TEXAS

ARANSAS COUNTY

United North & South Dev. Co.'s No. 1 Kate Edwards, Lewis Sur. ..... Drlg. 4,940 ft.

ATASCOSA COUNTY

Tom Draper's No. 1 McCoy, Sur. 234 ..... Location; dropped from reports.

BASTROP COUNTY

Gulf Production Co.'s No. 2 Bell, Riley Sur ..... Location; dropped from reports.
Jim Harper and others' No. 1 R. R. Mitchell ..... Derrick.
Hadley Oil Co.'s No. 1 F. Kiel, R. H. Grimes Sur., 150 ft. E line, 1,000 ft. S line ..... Drlg. 2,340 ft.
Howell Oil Corp.'s No. 1 F. Wichman ..... Fishing 1,995 ft.
Humble Oil & Refg. Co.'s No. 1 Hendris, L. G. Lentz Sur., 150 ft. N and E lines ..... Location.
Humble Oil & Refg. Co.'s No. 2-A Hayward, S. S. Wolfenbarger Sur., 35 ft. S of 1-A ..... Location.
Humble O. & R. Co.'s No. 1-A Wolfenbarger, S. Wolfenbarger Sur. ..... Location.
Moore & Ortman's No. 1 Ortman, Andrew Graham Sur... Location.
E. W. Ogden's No. 1 Goodman ..... Drlg. 2,540 ft.
Pacific Oil & Gas Co.'s No. 1 Darnell & Bickler, Martha Baker Sur. ..... Shut down 2,030 ft.
Sun Oil Co.'s No. 1 F. Anderson, M. Green Sur. ..... Drlg. 1,607 ft.
Superior Oil Co.'s No. 1-A Watson, A. Martinez Sur., 600 ft. E line, 240 ft. S line ..... Location.
Superior Oil Co.'s No. 1-A Hayward, I. P. Wallace Sur... Location.
Superior Oil Co.'s No. 1-A J. D. Owens, J. Wright Sur. .. Location.

BEE COUNTY

Houston Oil Co.'s No. 1 McKinney, L. C. Randolph Sur. ..... Drlg. 850 ft.

BEXAR COUNTY

Guy S. Fisher's No. 1 S. L. Beck, P. W. Hays Sur. ..... Drlg. 580 ft.
F. H. Eckert's No. 1 Sandemer, Sur. 52 ..... Drlg. 540 ft.
F. H. Eckert & Son's No. 1 Bonewicz, Sur. 5, 150 ft. S and W lines ..... Location.
Penn-Tex Oil Co.'s No. 1 Kate May, F. R Desauge Sur. No. 134 ..... Set casing 95 ft.
Hamilton & Kennon's No. 1 Hamilton, near Gas Ridge .. Drlg. 1,670 ft.
Moore-Jauer's No. 1 Holly R. Ellison ..... Waiting on csg. 1,714 ft.
C. J. Le Compte's No. 3 R. Diaz, J. M. Urrigas Sur. .... Location.
Leon Oil Co.'s No. 1 Reiniger, 300 ft. E line, 215 ft. S line ..... Drlg. 1,350 ft.
E. G. Potter's No. 1 Watson, B. Martinez Sur. ..... Coring 2,550 ft.

BLANCO COUNTY

J. Bekning's No. 1 Butler, Butler Sur. ..... Moving in machinery.
J. E. Forbes et al's No. 1 Bruckner ..... Shut down 1,255 ft.; contract depth.
Ashe & Marshall's No. 1, 5 mi. S Johnson City ..... Erecting derrick.

BROOKS COUNTY

Milam Drlg. Co.'s No. 6 Reilly Allen, SW part of county.. Shut down.
A. W. Dinn's No. 1-B Garcia ..... Drlg. 1,290 ft.; shale.
Houston Oil Co. of Texas' No. 1 Lassiter, Sur. 69 ..... 40,000,000 ft. gas, 1,690 lbs. pres.

CALDWELL COUNTY

Joe Bruner's No. 1 Neil, S. Morris Sur., 400 ft. NE and NW lines ..... Location.
Smi-Lock Oil Co.'s No. 1 Munster, Silas Fuqua Sur. .... Drlg. 2,950 ft.
Cranfill & Reynolds' No. 1 Berensdorf, A. Floyd Sur. .. Location.
W. H. Harper's No. 3 Thomas, J. Roberts Sur. ..... Drlg. 1,724 ft.
Harper et al's No. 2 Miller, P. Martinez Sur ..... Drlg. 1,650 ft.
H. C. Ratcliff's No. 1 J. E. Cardwell, J. P. Bell Sur. .... Drlg. 1,684 ft.
John T. Callihan et al's No. 1 W. Ellison ..... Drlg. 2,750 ft.
J. S. Brutsche's No. 1, R. L. Quinn Sur. ..... Location.

COLORADO COUNTY

Cagle-Concord Oil Co.'s No. 1, Sec. 42 ..... 1,500 ft. core test, dropped.

DE WITT COUNTY

Gibson & McIntyre's No. 1 Wm. Van Roeder ..... Shut down 1,580 ft.
H. T. Ree's No. 1 Lunhardt ..... Derrick.

DUVAL COUNTY

Simms Oil Co.'s No. 5 Dinn, Sec. 62, 500 ft. W line, 660 ft. S. line ..... Location.
Magnolia Petroleum Co.'s No. 1 Corbett, Sur. 96 ..... Abandoned 4,912 ft.
National Oil Co.'s No. 2 Ball, Agua Poquita Sur., Blk. 3.. Derrick.
Southern Oil Co.'s No. 1 Welder Ward, Sur. 215 ..... Location.

EDWARDS COUNTY

A. M. Griffith's No. 1 Wardlaw ..... Shut down 3,000 ft.

FAYETTE COUNTY

Muldoon Oil & Gas Co.'s No. 1 Kemp, M. Smith League .. Derrick.
W. J. Kelly's No. 1 Burke ..... Shut down 1,000 ft.; account of title.

GOLIAD COUNTY

Compton Oil Co.'s No. 1 Fromme, Dexter Survey..... Derrick.
Humble Oil & Refg. Co.'s No. 1-A Spangle ..... Drlg. 316 ft.
F. P. Zoch's No. 1 Kaufman ..... Drlg. 2,010 ft.
Mission Drlg. Co.'s No. 3 Roy Rand, 3 miles E of No. 2. This formerly carried in Bee County, Pettus Pool. ... Drlg. 4,550 ft.
Western Union Oil Co.'s No. 1 Lucas, Juan Moya Delgado Sur. ..... Set surface casing.

(Continued on Page 202)

SOUTHWEST TEXAS

Branyon	35
Bruner	42,135
Dale	520
Darst Creek	985
Kingsville	515
Larremore	165
Luling	10,615
Lytton Springs	960
McMullen County	45
Medlina County	23
Mirando	11,235
Somerset	1,789
Yoast	1,160
Total	70,182
Week ending Septem er 28	72,309
Decrease	2,127

New Area Opened in the Humble Field

West Production Co. Completes Well Flowing 2,000 Bbls. Location Is On Tract Where Two Dry Holes Were Sunk

By Neil Williams
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., Oct. 7.—West Production Co. opened up a new area at Humble Field, Harris County, with its No. 1 Foster. This well came in flowing estimated at 2,000 bbls. pipe line oil, from a depth of 4,865 feet. It is located north of the river and is on the tract where the Gulf Production Co. drilled two dry holes. No. 1 Foster of West Production Co., is located 246 feet northeast of No. 1 Foster of the Gulf Production Co. This well has fallen off in production since its completion and is now being put on the pump.

The Sun Oil Co. completed No. 1 McKinney on the southeast side of Barbers Hill, Chambers County, at a total depth of 5,210 feet, for 300 bbls. The deep test of Yount Lee Oil Co. on the south side of Barbers Hill, No. 8 Chambers, was abandoned at a depth of 8,148 feet.

The Humble Oil & Refining Co. and Valley Oil Corp. completed their No. 4 Urban, at Raccoon Bend, Austin County, at a depth of 3,237 feet, for 200 bbls. of pipe line oil. This field is continuing to show up good, and it now has an approximate daily production of 8,000 bbls.

In addition to the completion of West Production Co.'s No. 1 Foster, the South Texas Petroleum Co., at Humble, Harris County, completed No. 10 Morris, on the south side of the dome, for 750 bbls. pipe line oil at a depth of 4,372 feet.

At Refugio, Refugio County, Houston Gulf Gas Co.'s No. 1 Vance was completed at 3,701 feet for 400 bbls. of pipe line oil. Mission Drilling Co.'s No. 1 O'Brien was completed at 4,433 feet for 90 bbls. The Mission Drilling Co. is changing over to a heavier rig on its No. 2 Mitchell, while it is sidetracking in No. 1 Fox (a workover), and drilling in sandy lime at 1,803 feet.

There were two completions at Hackberry, Cameron Parish, Louisiana. The Ryeade Oil Corp. and Humble Oil & Refining Co.'s joint test No. 3 Gulfland, is flowing 189 bbls. of pipe line oil, while at old Hackberry, Sunshine Oil Co.'s No. 3 Ellender was completed at 3,319 feet, flowing 1,050 bbls. pipe line oil.

The Rex Petroleum Co., at Edgerly, Calcasieu Parish, Louisiana, completed No. 10 Hunter (a workover) at a depth of 4,290 feet, for 300 bbls. pipe line oil.

Yount Lee Oil Co. is going deeper with its No. 7 Houssiere-Latrielle at Jennings, Acadia Parish, now drilling in shale at 6,230 feet; while its No. 4 Crowley is in sand at 7,675 feet.

The Union Sulphur Co. completed two wells at Sulphur, which will tend to hold its daily average production up. No. 750 fee was completed for 1,100 bbls. pipe line oil, while No. 751 fee was completed for 3,400 bbls. pipe line oil.

At Anse La Butte, St. Martin Parish, Yount Lee Oil Co. is coring at 4,900 feet in its No. 5 Louisiana Pet Co.

The test near Sandy Point, in Brazoria County, on what is supposed to be a dome, is down to 1,103 feet in gumbo. This is Steel & Strickland's No. 1 Lockridge.

The Gulf Production Co.'s deep test on the Long Point Dome in Fort Bend County, Texas, No. 12 Trone, is now in shale at 5,145 feet. It is understood that this well is to be drilled to 6,000 feet.

Gulf Production Co. completed its No. 2 Boyt at Hankamer in Liberty County for 500 bbls. pipe line oil.

GULF COAST

Texas	
Allen	11
Barbers Hill	23,130
Batson	1,250
Big Creek	2,762
Blue Ridge	2,745
Brenham	410
Boling	1,413
Clay Creek	1,795
Damon Mound	600
DeWalt	14,100
Fannette	60
Goose Creek	5,712
High Island	1,600
Hull	8,930
Humble	9,331
Jasper County	10
Lost Lake	955
Markham	410
Nash	450
North Dayton	515
Orange	2,620
Orchard	75
Pierce Junction	14,835
Port Neches	510
Refugio	8,315
Raccoon Bend	8,225
Sheeks	200
Saratoga	910
Sour Lake	2,715
S. Liberty-S. Dayton	4,935
Spindletop	24,200
West Columbia	6,105
Total Texas Coast	149,834
Week ending September 28	149,874
Decrease	40

South Louisiana	
Anse La Butte	50
Bayou Bouillon	120
Black Bayou	51
Dog Lake	10
Edgerly	820
Jennings	2,310
Hackberry	4,630
Lockport	3,540
Port Barre	135
Sorrento	81
Starks	331
Sulphur	6,250
Sweet Lake	21
Vinton	4,426
Welsh	615
Total South Louisiana	23,390
Week ending September 28	23,129
Increase	261
Total Gulf Coast	173,224
Week ending September 28	173,003
Increase	221

GULF COAST FIELDS AND WILDCATS

Week Ended October 5

BARBERS HILL—CHAMBERS COUNTY

Mills Bennett Production Co.'s No. 1 Collier (southeast).. Fishing 5,490 ft.
Mills Bennett Production Co.'s No. 1 Barber (north side).. Shale 5,587 ft.
Mills Bennett Production Co.'s No. 7 Barrow (workover).. Temporarily shut down 4,800 ft.
Mills Bennett Production Co.'s No. 3 Smith (workover).. Lime 5,060 ft.
Mills Bennett Production Co.'s No. 3 Hammon-Armstrong (southeast) ..... Derrick.
Grayburg Oil Co.'s No. 1 Wilburn, southeast ..... Location.
Gulf Prod. Co.'s No. 1 Wilburn ..... Started drilling.
Humphreys Corp.'s No. 8-A Kirby, north flank ..... Fishing 6,440 ft.
Humphreys Corp.'s No. 4-H Kirby, east side ..... Drlg. shale and lime 4,974 ft.
Humphreys Corp.'s No. 5-H Kirby, east side ..... Drlg. shale and lime 4,240 ft.
Humphreys Corp.'s No. 6-H Kirby east side ..... Sandy lime 3,000 ft.
Humphreys Corp.'s No. 7-H Kirby, east side ..... Sand and boulders 1,900 ft.
Humphreys Corp.'s No. 2 Kirby ..... Drlg. sand and bldrs. 1,958 ft.
D. B. McDaniels' No. 3 Woodward ..... Gumbo 850 ft.
Rexal Oil Co.'s No. 3 McLean, east flank ..... Trying to plug off water at 5,170 ft.
Sinclair Oil & Gas Co.'s No. 1 McKinney (southeast) .... Drlg. shale 5,300 ft.
Sinclair Oil & Gas Co.'s No. 1 Wilburn (southeast) ..... Drlg. lime 4,975 ft.
Sun Oil Co.'s No. 1 McKinney (southeast ..... Flowing 300 bbls.
Sun Oil Co.'s No. 2 McKinney (southeast) ..... Setting cement 5,350 ft.
Sun Oil Co.'s No. 1 Wilburn (southeast) ..... Shale 3,640 ft.
Sun Oil Co.'s No. 1 J. Wilburn ..... Drlg. shale 2,610 ft.
Superior Oil Corp.'s No. 1 Hooks-Collier, southeast ..... Drlg. shale 3,900 ft.
Superior Oil Corp.'s No. 2 Hooks-Collier, southeast ..... Drlg. gumbo 2,465 ft.
The Texas Company's No. 1 Wilburn (southeast) ..... Rock 1,926 ft.
The Texas Company's No. 1 fee ..... Rigging up.
F. L. Thompson's No. 1 Wilbur ..... Sand 4,610 ft.
Yount Lee Oil Co.'s No. 4 Chambers, southwest ..... Abandoned 8,148 ft.
Yount Lee Oil Co.'s No. 8 Chambers, south ..... Sand at 4,590 ft.
Yount Lee Oil Co.'s No. 1 Kirby, southeast ..... Shale 6,840 ft.
Yount Lee Oil Co.'s No. 2 Woodward (southeast) ..... Caving 5,205 ft.
Yount Lee Oil Co.'s No. 3 Woodward (southeast) ..... Gumbo and lime 3,325 ft.

BOLING—FORT BEND AND WHARTON

Sun Oil Co.'s No. 8 E. C. Farmer ..... Drlg. gyp 1,580 ft.
The Texas Company's No. 2 Pleasants, northwest ..... Drlg. sticky shale 4,532 ft.
Vacuum Oil Co.'s No. 3 Taylor, south side ..... Sidetracking 3,907 ft.; total depth 3,940 ft.

RACCOON BEND—AUSTIN COUNTY

Humble & Valley's No. 3 Mitchell ..... Rig.
Humble & Valley's No. 5 Walton ..... Drlg. plug 3,280 ft.
Humble & Valley's No. 5-A Deitrichs ..... Shale 3,498 ft.
Humble & Valley's No. 6-B Dietrichs ..... Waiting on cement 3,301 ft.
Humble & Valley's No. 6-A Dietrichs ..... Building derrick.
Humble & Valley's No. 7 Dietrichs ..... Derrick.
Humble Oil & Refg. Co.'s No. 8-B Dietrichs ..... Building derrick.
Humble & Valley's No. 9-A Dietrichs ..... Derrick.
Humble Oil & Refg. Co.'s No. 1 Dimear ..... Sand and shale 2,730 ft.
Humble & Valley's No. 2 Jackson ..... Drlg. plug 3,375 ft.
Humble & Valley's No. 1 Graneau ..... Drlg. shale and lime 2,971 ft.
Humble & Valley's No. 4 Bellevue School ..... Hard shale 2,133 ft.
Humble & Valley's No. 3 Woodley ..... Waiting on casing 3,148 ft.
Humble & Valley's No. 2-A Grawunder ..... To pump 3,335 ft.
Humble & Valley's No. 4-B Grawunder ..... Sandy shale 314 ft.
Humble & Valley's No. 5-B Grawunder ..... Derrick.
Humble & Valley's No. 3 Grawunder ..... Waiting on cement 1,203 ft.
Humble & Valley's No. 3 Reese ..... Swabbing 3,516 ft.
Humble & Valley's No. 4 Urban ..... 200 bbls. PLO 3,237 ft.
Humble & Valley's No. 5 Urban ..... Waiting on cement 190 ft.
Humble & Valley's No. 4 Saunders ..... Hard sandy lime 3,232 ft.
Humble & Valley's No. 3 Mueller ..... Drlg. plug 3,392 ft.
Humble & Valley's No. 4 Mueller ..... Sand 3,149 ft.
Humble & Valley's No. 5 Mueller ..... Drlg. plug 1,229 ft.
Humble & Valley's No. 2 Helmuth ..... Drlg. plug 3,168 ft.
Humble & Valley's No. 1 Diemer ..... Shale 940 ft.
Humble & Valley's No. 3-A Bracey ..... Waiting on cement 3,337 ft.
Humble & Valley's No. 2 J. W. Wilson ..... Drlg. plug 3,144 ft.
Humble & Valley's No. 1 McCalfland ..... Sand rock 903 ft.
Humble & Valley's No. 5 Gotosky ..... Derrick complete.
Humble & Valley's No. 6 Gotosky ..... Building derrick.

DE WALT—FORT BEND COUNTY

Humble Oil & Refg. Co.'s No. 7 Brazos ..... Cem. 6⅝-in. casing 3,349 ft.
Humble Oil & Refg. Co.'s No. 8 Brazos ..... Shale 663 ft.
Humble Oil & Refg. Co.'s No. 3 Hamner fee ..... Location.
Humble Oil & Refg. Co.'s No. 6 Hamner fee ..... 450 pounds 3,618 ft.
Humble Oil & Refg. Co.'s No. 2-A Bankers Mortgage .. Drlg. sticky shale 3,645 ft.
Humble Oil & Refg. Co.'s No. 3-A Bankers Mortgage .. Location.
Humble Oil & Refg. Co.'s No. 8 Camp ..... Drlg. shale 3,236 ft.
Humble Oil & Refg. Co.'s No. 1 Hagenson ..... Waiting on cement 3,811 ft.
Humble Oil & Refg. Co.'s No. 3 Deatherage ..... Shale 3,391 ft.
Humble Oil & Refg. Co.'s No. 12 Sugarland ..... Sticky shale and lime 2,200 ft.
Humble Oil & Refg. Co.'s No. 13 Sugarland ..... Derrick.
Humble Oil & Refg. Co.'s No. 6 Nelson ..... Sandy shale and lime 2,739 ft.
Humble Oil & Refg. Co.'s No. 1 Peterson ..... Waiting on cement 1,236 ft.

HUMBLE—HARRIS COUNTY

Continental Oil Co.'s No. 1 Wagner ..... Sidetracking 3,660 ft.

(Continued on Page 213)

POTENTIAL SUNBURST PRODUCER ON SOUTHERN ALBERTA BORDER

By Victor Lauriston
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, Oct. 5.—The border area of southern Alberta has come into the spotlight with a potential producer from the Sunburst sands. Vanalta Oils' No. 1, SW Section 4-1-16w4, recently got a large dry gas production at 2,390 feet. The gas was accompanied by traces of oil. Drilling was continued to the Sunburst-Ellis contact at 2,470 feet, when the gas pressure started to spray a light green crude over the derrick. The oil rose to 1,000 feet in the hole, and two hours' steady bailing failed to lower it. Production is apparently from a stray sand; the crude is reported between 30 and 35 gravity. The well bailed around 10 bbls. an hour on a preliminary test. If it is found a commercial producer it will be finished at this depth and No. 2 started at once; if not, it will be continued to the main producing horizon at the Ellis-Madison contact.

Vanalta's No. 1 is 6 miles west of Coutts, and about 200 yards north of the Montana border, on the Red Coulee structure. It is northwest of the Kevin-Sunburst Field. The same structure was tested some years ago by Imperial Oil, Ltd., about a mile west, with a fair show of a similar grade of crude in what appears to have been the same horizon but was drilled deeper and was ultimately abandoned at 2,706 feet owing to water troubles. Vanalta's No. 1 is 184 feet higher structurally than Imperial's Red Coulee well. The gas flow from the top of the Sunburst sand at 2,390 feet was first estimated at 10,000,000 feet, but later reports place it around 3,600,000 feet.

Vanalta Oils, Ltd., was drilling on acreage subleased from Alberta Pacific Consolidated Oils, Ltd., of Calgary, which holds 2,500 acres on the Red Coulee structure. It is understood that following the failure of Imperial's Red Coulee well the Imperial leases were abandoned and the entire structure is now controlled by independent companies. Vanalta Oils, Ltd., was financed largely by Vancouver capital. Location was made by Dr. T. B. Williams, geologist, and J. W. Elliott of Montana had the drilling contract.

Considerable drilling has been done in this area since the Kevin-Sunburst Field was opened about 8 years ago. Gas has been encountered in a number of tests, but, outside heavy crude in two wells in the Skiff Field, the Red Coulee strike

Continued on Page 209)

Superior

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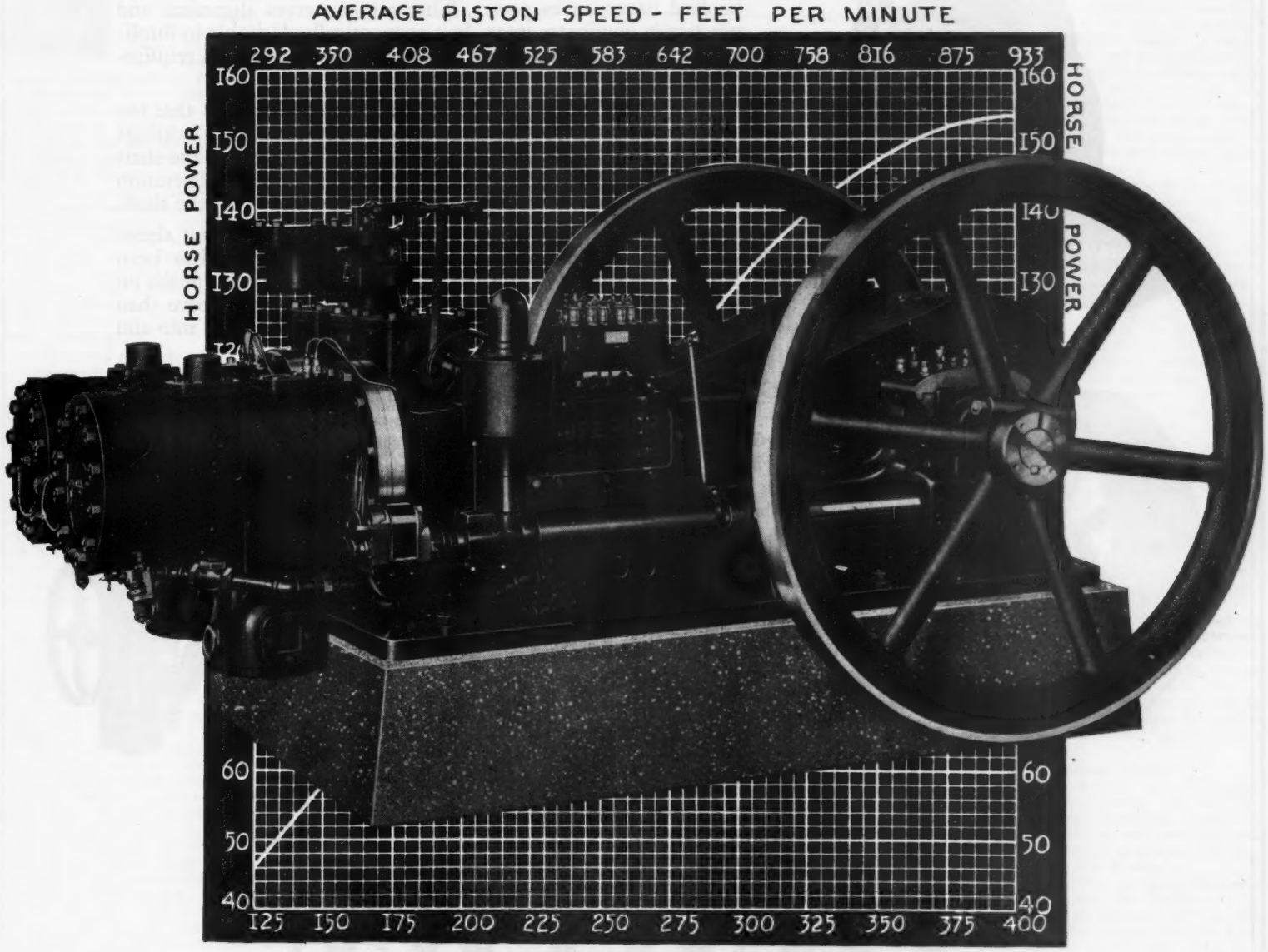

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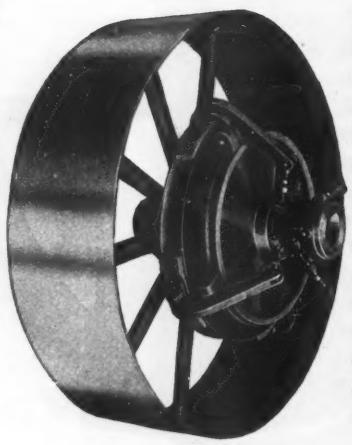

Medart V Groove Friction Clutch Pulley--This is the Medart V Groove Friction Clutch with extended sleeve or hub on V Sheave, to which can be attached either a pulley, gear or sprocket wheel. This extended hub can be supplied with either a Babbitted Sleeve, Bronze Bushing or Timken Roller Bearings. This type of Friction Clutch is made for general transmission work. It possesses the fundamental advantages, simplicity of construction, ease of adjustment, positive action and has large starting capacity. No springs, cams, or intricate apparatus are employed.

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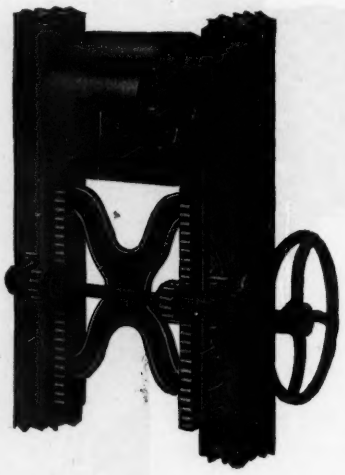

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Hobbs Pool Extended Half Mile South

Midwest Well Making 430 Bbls. Increased Drilling in San Simion Area. New Horizon in Frannie District, Wyoming

By Tolbert R. Ingram
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., Oct. 7.—The Hobbs Pool in Lea County, New Mexico, which was located with the aid of geophysical instruments, has been extended half a mile to the south in the Midwest Refining Co.'s No. 24 Leach, which is making 430 bbls. a day from a total depth of 4,136 feet. The San Simion district is showing a considerable increase in drilling activity as a result of the completion of a 1,700-bbl. well in Cranfill & Reynolds' No. 1-B State. The Humble Oil & Refining Co. has a 680-bbl. well in the Jal district in its No. 1-B Lindley and the Continental Oil Co. completed a 139-bbl. producer in its No. 1 Wells in the same area.

In Colorado the fire in the White Eagle Oil & Refining Co.'s Piceance Creek test was extinguished and rig is being rebuilt. New gas encountered just before the fire amounted to about 6,000,000 feet a day. Two new operations in the Florence district and one well abandoned in the Two Creek Field marked the week's developments.

The discovery of oil in a new horizon, the Madison lime, on the Frannie Dome in Park County, Wyoming, in the Midwest's No. 36 Rosenberg, which made 2,424 bbls. in 24 hours, continues to be discussed. This same horizon is reported to have been cut on the Oregon Basin Dome in the Enalpac Oil & Gas Co.'s No. 2 Cactus, which responded with an initial production of 1,750 bbls. The Mountain Fuel Supply Co.'s No. 1 Newberry, on the Hiawatha Dome in Sweetwater County, which extended the proven area one-fourth of a mile to the north, has been completed as a 30,000,000-foot gas well and shut in.

NEW MEXICO

Another extension of the Hobbs Pool in Lea County, southeastern New Mexico, took place this week in the Midwest Refining Co.'s No. 24 Leach, NE SE NW, Section 15-19-38, half a mile to the south and a little to the west of Harry Walker and others' No. 1 Terry, NW SW SE, Section 10-19-38, the nearest producer. The Leach well topped the pay at approximately 4,105 feet and was drilled to 4,136 feet. It is averaging 430 bbls. a day. It may be drilled a little deeper. Harry Walker's No. 1 Terry, which two weeks ago extended the pool a mile to the southeast, is bottomed at 4,155 feet in lime and is flowing an average of 430 bbls. a day. Two offests have been spotted. One is the Midwest Refining Co.'s No. 24 State, NE SE SW, Section 10-19-38, on the west, and the other is the Shell Petroleum Corp.'s No. 1 B. L. Thorpe, SW NE SE, Section 10-19-38, on the north. The Shell Petroleum Corp.'s No. 1 Terry, SE SW NE, Section 22-19-38, a mile south of No. 24 Leach, is drilling at 3,065 feet. It topped the brown lime at 2,939 feet and had a show of oil and gas at 3,026-28 feet. The Humble Oil & Refining Co.'s No. 1 Bowers, C NE SE, Section 30-18-38, 3 miles northwest of the nearest producer, is bottomed at 3,404 feet in lime and is cleaning out to test. While fishing for drill stem was in progress it averaged about 15 bbls. an hour. The 3-inch tubing was run after the stem was out to make a test, but the tubing sanded up before any reliable gauge of production could be made. The Ohio Oil Co.'s No. 1 State, SE SW, Section 9-19-38, is drilling below 3,925 feet. There are now five producing wells in the Hobbs area, of which three belong to the Midwest. This company has not yet announced what disposition it will make of the oil. The pool is so far away from its Wyoming refineries and the freight haul is so long it is considered doubtful if it will be shipped in that direction. It is understood both the Humble Oil & Refining Co. and The Texas Company are anxious to contract for the Midwest's output. These two companies have lines within a short distance on the south.

San Simion District

In the San Simion district in Lea County, there is a pronounced increase in activity following the completion of Cranfill & Reynolds' No. 1-B State, NE cor., Section 2-21-33, pumping an average of 1,700 bbls. a day from a total depth of 3,755 feet. It made 1,756 bbls. the first 24 hours with 20,000,000 feet of gas. The elevation is 3,788 feet and the top of the salt was at 1,736 feet, the base at 3,370 feet, and the top of the brown lime was at 3,390 feet. The pay was found at 3,750-55 feet. Cranfill & Reynolds' No. 2-B State, NW NE NE, Section 2-21-33, an offset on the west, is rigging up, and their No. 3-B State, SW NE NE, of the same section, an offset on the southwest, is digging cellar. Snowden & McSweeny's No. 1 State, NW cor. SW, Section 1-21-33, half a mile to the south of Cranfill & Reynolds' No. 1-B State, is digging cellar, and the Continental Oil Co.'s No. 1 State, NW cor. Lot 12, Section 1-21-33, is drilling at 180 feet. The Amerada Petroleum Corp. will offset the Cranfill & Reynolds well on the northeast, and has made a location for its No. 1 State, Lot 7, Section 1-21-33. The Texas Production Co.'s No. 1 State, in Section 2-21-33, has rig up. The Empire Gas & Fuel Co.'s No. 3-B State, SW NE SE, Section 5-21-35, is bottomed at 1,725 feet in anhydrite and fishing for bit. The top of the anhydrite was 1,720 feet. C. E. Reynolds and others' No. 1 Merchant, SE cor. NE, Section 15-22-34, is drilling at 3,535 feet in anhydrite. It bottomed the salt at 3,520 feet. The elevation is 3,905 feet.

Jal District Well

In the Jal district in Lea County, the Humble Oil & Refining Co. has a completion in its No. 1-B Lindley, C SE SE, Section 14-25-36, just northeast of its No. 1 Lindley and Cranfill & Reynolds' No. 1 Wilson. It found the pay at 3,420-38 feet and was completed at 3.438 feet, making 680 bbls. of oil and 6,000,000 feet of gas the first 24 hours. The Midwest Refining Co.'s No. 22 Gregory, NW SE SW, Section 31-25-37, will not be drilled deeper and has been completed at 3,320 feet with an initial production of 100 bbls. The Continental Oil Co.'s No. 1 Wells, SW SE NE, Section 11-25-36, also is a completion. It was drilled to 3,560 feet and plugged back and shot with 50 quarts at 3,385-3.420 feet and completed with a production of 139 bbls. the first 24 hours. The same company's No. 1 McCallister, SW cor. SE, Section 24-26-36, is standing cemented at 3.255 feet after plugging back from 3,260 feet. Cranfill & Reynolds' No. 1 Cushman, SW SE NW, Section 23-24-36, half a mile east and a little north of its No. 1 Myers gasser, is drilling at 220 feet in red rock, and the Magnolia Petroleum Co.'s No. 1 Lindley, SE cor. NE, Section 26-25-36, is fishing out pipe of which five joints have been recovered. Total depth is 2,961 feet.

Eunice District

In the Eunice district in Lea County, the Empire Gas & Fuel Co.'s No. 1 Closson, NE NW SE, Section 6-22-36, has mudded and cemented off the gas and is preparing to drill deeper. The flow gauged 110,000,000 feet, the well being the largest gasser so far completed in New Mexico. The Gypsy Oil Co.'s No. 1 Mattern, SW cor. SE, Section 24-21-36, is bottomed at 3,950 feet in lime and straightreaming to lower casing and shut off sulphur water at 3,937 feet. The Continental Oil Co.'s No. 1 William Meyer, SW cor. NW, Section 28-22-36, is drilling at 3,500 feet and is reported to have had 18,000,000 feet of gas at 3,490 feet. Same company's No. 1 A. E. Meyer, SW SW, Section 17-21-36, is bottomed at 3,278 feet and rigging up rotary.

Other Lea County operations include the following: The Penn Oil Co.'s No. 1 State, NE Section 21-19-36, is drilling at 1,810 feet in anhydrite and red shale, and A. D. Morton and others' No. 1 State, C NW, Section 29-11-38, Tatum district, is shut down at 1,725 feet in red shale. The Maljamar Oil & Gas Co.'s No. 2 Baish, NE cor. SW, Section 21-17-32, Caprock district, is drilling at 3,613 feet in lime and had another gas show at this depth. The Texas & Pacific Coal & Oil Co.'s No. 2 State, NW cor. SW, Section 21-23-36, is drilling at 3,682 feet in lime and estimated making 25,000,000 feet of gas. It is preparing to run the 6⅝-inch casing. The Barnsdall Oil Corp.'s No. 1 Bronox, SE cor. (corrected) Section 28-16-38, Lovington district, is digging cellar, and Buell & Hagen's No. 1 State, C NE, Section 33-11-35, Tatum district, is shut down at 3,212 feet after cementing cave.

Eddy County

Eddy County had no important developments. Leonard & Lever's No. 1 State, NW cor., Section 19-20-30, is abandoned as a location. The Prairie Oil & Gas Co.'s No. 2 Keel, SW cor., Section 7-17-31, West Maljamar district, a recent completion, is now on production. The elevation of this well is 3,729 feet, and it was drilled to a total depth of 3.600 feet. It made 110 bbls. of oil and 500,000 feet of gas the first 24 hours from the lime at 3,315-37 and 3,542-58 feet. The top of the salt was at 541 feet, and the base at 1,282 feet. The top of the lime was at 2,135 feet. Flynn, Welch & Yates' No. 2 Gissler, also a recent completion, SE cor. SW, Section 12-17-30, has an elevation of 3,669 feet, and was drilled to 3,615 feet. It made 100 bbls. of oil and 2,500,000 feet of gas the first 24 hours. The top of the salt was at 515 feet, the base at 1,265 feet, and the top of the lime at 2,755 feet. Leonard & Levers' No. 1 Levers, NW cor. SE, Section 21-17-29, is drilling at 550 feet, and Lockart and others' No. 1 Parke, SE cor., Section 10-17-30, is shut down at 1,275 feet for cement to set. The Grayburg Oil Co.'s No. 2 Keely, C SE NE, Section 24-17-29, is fishing at 2,140 feet. and the Mesa Oil Co.'s No. 1 Seale, SW cor., Section 12-20-27, is drilling at 610 feet.

UTAH

The Continental Oil Co.'s No. 1 Boundary Butte, Section 22-43-22, San Juan County, southeastern Utah, which was delayed by a fishing job for the past two weeks at 5,560 feet, is again making hole, the bit having been recovered and drilling being in progress at 5,567 feet. The hole is bottomed in the lower Pennsylvanian and drilling is necessarily slow on account of the depth and the heavy gas pressure from above. The Cisco Springs Syndicate's No. 1, Section 9-20-23, Grand County, is reported to have completed repairs to rig and to be preparing to resume at 1,965 feet. It is believed to be bottomed just above the Dakota. The Crescent Oil Syndicate's No. 1 McCarthy, SW cor., Section 27-21-19, Grand County, is drilling at 1,940 feet.

COLORADO

Developments in Colorado were mostly routine. The White Eagle Oil & Refining Co.'s No. 1-A Fordham, NW SW, Section 9-2s-96, on the Piceance Creek structure in Rio Blanco County, which last week was reported encountering a new gas horizon at 2,815 feet followed by a fire in which the rig was destroyed and four men severely burned, is rebuilding rig. The hole was not seriously damaged and it is expected drilling will be under way again within a week. The Texas Production Co.'s No. 1 Potter, C NE SW, Section 30-2n-96, on the White River structure in the same county, is drilling at 4,051 feet and will be carried to 4,500 feet at least.

In Moffat County, the Texas Production Co.'s No. 1 Berlin, SW NE, Section 19-12n-100, Bartram Dome, Hiawatha district, is bottomed at 1,630 feet and underreaming the 10-inch at 1,625 feet after mudding off approximately 50,000,000 feet of gas to drill deeper. Thomas McLaughlin, and others' No. 1 Williams, NW SW, Section 2-3n-92, in the fault block south of the Iles Dome, is drilling in sand at 4,232 feet. This is believed to be the lower Morrison. The Sundance, expected within the next 50 to 75 feet, is the objective.

In Routt County, the Texas Production Co.'s No. 2 State-Lubers, SE SW SE, Section 7-6n-86, Tow Creek Dome, missed the shale pay and is being abandoned at a total depth of 3,860 feet. Crew will be moved over to its No. 3 Carstarphen, SW NE NW, Section 5-6n-86, which is building rig. The Midwest Refining Co.'s No. 1 Barmettlor & Clayton, NE NW, Section 4-7n-86, Chimney Creek Dome, is drilling at 1,638 feet in black shale below the Dakota with the Sundance as the objective.

In Jackson County, the Midwest Refining Co.'s No. 21-X Rich, SW NW, Section 9-6n-80, Buffalo Creek, is drilling at 2,885 feet in gray sandy shale, and the Producers & Refiners Corp.'s No. 1 Hendershot, SE NE, Section 2-6n-81, Pole Mountain, is bottomed in sand at 2,715 feet and underreaming the 10-inch at 2,690 feet.

Larimer County

In Larimer County, the Continental Oil Co.'s No. 1 Fleming, NW SE NW, Section 6-9n-68, Wellington Dome, is drilling at 4,231 feet and making 5 bbls. of oil, 1,500,000 feet of gas and 688 bbls. of water from the Muddy.

In Bent County, in the southeastern part of the state, the Continental Oil Co.'s No. 1 Pipe Springs, NE cor. SE, Section 27-27-49, is shut down at 5,067 feet with water in the hole. This well missed the granite ridge encountered in the Marland's No. 1 Mesa, 18 miles to the southwest, which was abandoned at 2,085 feet in 1928. It is generally agreed that more wells will have to be drilled in that territory before the doubts regarding the subsurface geology are cleared up.

In Huerfano County, the Parker Club, Inc.'s No. 1 Fee, Section 4-28s-68, Badito-Alamo Dome, joint with the Kinney-Coastal Oil Co., has landed the 6¼-inch on bottom at 3,678 feet to shut off cavy ground and is preparing to resume drilling. A little gas is showing at the bottom of the hole.

Two new operations are reported getting under way in the Florence district in Fremont County. M. L. Eno's No. 1 Griffith, SE cor. NW, Section 5-20-69, is spudding in a 12-inch hole on a 40-acre tract which has had some shale production in the past, and Donnelly Brothers'

(Continued on Page 208)

Ultimatum to Ventura Ave. Operators

State of California Assumes Aggressive Attitude on Gas Conservation and Orders Operators in One Field to Comply

By L. P. Stockman
Staff Correspondent. California Fields

LOS ANGELES, Calif., Oct. 5.—The California State Department of Natural Resources has assumed an aggressive attitude with respect to enforcement of the gas conservation law which prohibits unreasonable waste of natural gas and if the department's policy is sustained as a result of impending litigation we may anticipate a strict but discretionary enforcement. R. D. Bush, state oil and gas supervisor, issued an ultimatum to operators in the Ventura Avenue Field on October 3 that they must immediately comply with the eixsting gas conservation law. After an extended hearing the state oil and gas supervisor ordered that the wastage of natural gas must be kept below 5,000 feet per day for each of the 175 producing wells in this field and that anything over that amount would be considered a measurable economic waste. New completions will be permitted to produce 10,000 feet of natural gas while some of the older producers will be allowed to produce 20,000 feet daily. Special attention is called to the fact that the order specifies a flat amount of natural gas each well will be permitted to produce, irrespective of the gas-oil ratio. Full compliance with this order will not reduce drilling operations, but should cut gas production in this field about 50 per cent, and this in turn is expected to reduce crude oil production about 25 per cent. Present production of crude oil in the Ventura Avenue Field approximates 62,000 bbls. daily.

Surplus production of natural gas in the Ventura Avenue Field approximated 140,000,000 feet early this week with an additional 115,000,000 feet sold to public utilities for commercial consumption. Under the new order 120,000,000 feet of natural gas will be transmitted to the Los Angeles metropolitan area since the capacity of Los Angeles Basin pipe lines is insufficint to supply the needs of that metropolis and adjacent cities. The pumping of 7,000,000 feet of natural gas daily from Ventura Avenue to Santa Barbara is prohibited, as the Elwood Field is capable of supplying all the gas needed by Santa Barbara and other neighboring communities. Frederick M. Kincaid, attorney representing Ralph B. Lloyd, owner of a large portion of the Ventura Avenue Field leased to the Associated and Shell companies, intimated that a fight will be made against the new order on the assumption that the state oil and gas supervisor is without jurisdiction to enter such an order. He has advised his client to demand that the Associated and Shell disregard the new order and serve notice that if the companies in question failed to disregard the order such a move would be considered as a breach of contract by the Lloyd interests.

TANKER SHIPMENTS FROM LOS ANGELES TO ATLANTIC AND GULF COAST PORTS

Commodity—	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Crude oil	.....	.....	.....	.....	997,250	2,745,697
Fuel oil	407,225	58,175	.....	.....	457,175	111,621
Diesel and gas oil	73,150	10,450	.....	.....	1,635,047	1,543,114
Gasoline	.....	.....	678,079	96,868	15,749,130	10,794,164
Naphtha distillate	.....	.....	.....	.....	81,750	259,600
Coastwise—						
Crude oil	677,222	96,746	876,029	125,147	21,209,967	19,210,841
Fuel oil	191,653	27,379	185,031	26,433	14,783,281	12,617,452
Diesel and gas oil	.....	.....	11,421	1,632	902,581	883,208
Gasoline	231,833	33,119	240,266	34,324	8,474,803	6,817,429
Kerosene	404	58	2,074	296	69,509	64,061
Naphtha distillate	.....	.....	.....	.....	.....	171,566
Exports—						
Crude oil	160,646	22,949	101,377	14,482	4,481,571	1,646,757
Fuel oil	571,422	73,060	411,290	58,756	13,965,514	17,500,755
Diesel and gas oil	54,984	7,855	80,783	11,540	2,060,773	1,924,316
Gasoline	137,261	19,609	250,338	35,763	9,023,843	5,481,024
Kerosene	.....	.....	23,775	3,396	2,445,606	3,416,049

TANKER SHIPMENTS FROM SAN FRANCISCO TO ATLANTIC AND GULF COAST PORTS

Diesel and gas oil	.....	.....	.....	.....	.....	342,425
Gasoline	.....	.....	76,420	10,744	1,658,845	1,672,095
Lubricants	.....	.....	.....	.....	138,706	277,151
Coastwise—						
Fuel oil	203,838	29,120	124,836	17,834	2,353,488	2,884,630
Diesel and gas oil	.....	.....	16,745	2,392	359,058	253,272
Gasoline	105,972	15,139	198,573	28,368	3,981,686	3,541,723
Kerosene	9,253	1,322	.....	.....	131,944	178,668
Exports—						
Crude oil	.....	.....	.....	.....	121,603	96,250
Fuel oil	.....	.....	.....	.....	657,681	1,930,943
Diesel and gas oil	.....	.....	65,092	9,299	326,657	10,400
Gasoline	33,461	4,780	52,725	7,446	4,181,576	3,601,512
Kerosene	.....	.....	121,330	17,333	528,060	464,080
Lubricants	.....	.....	.....	.....	25,713	33,535

Kettleman Hills

The Ohio Oil Co.'s No. 1 Smith in Section 35-24-19, located in the south dome of the Kettleman Hills Field of Kings County, failed to result in a natural flow from 7,002 feet after several days of continuous swabbing. The showing of this well was a distinct disappointment but it cannot by any stretch of imagination be classified as a conclusive test of the area at its present depth. It is the consensus of opinion among field men that another 500 feet of hole will probably result in the completion of a substantial producer, as the south dome is deeper stratigraphically than the north dome. The Ohio Oil Co. actually cored sufficient oil sand to warrant the expectation of getting substantial production in No. 1 Smith but the failure to secure a natural flow has not caused any great amount of anxiety for the reason just mentioned. It is interesting to note in this connection that a similar condition exists in the north dome where operators have been required to drill considerably deeper for production. The Standard Oil Co.'s No.81 in Section 11-22-17, for instance, is only yielding 995 bbls. daily from 6,673 feet, whereas the Continental's No. 8 in Section 12-22-17 is flowing 6,800 bbls. daily from 6,876 feet.

The United States Department of Interior has wisely decided that it will not be necessary for operators in the Kettleman Hills Field to make a production test before qualifying for federal leases, due to extremely high gas pressures encountered. This decision is especially timely as it is quite probable that some of the wells permitted to drill into completion in compliance with the Kettleman Hills agreement would develop such a high gas pressure that they could not be safely shut in. It is also of importance in view of prevailing field rumors that some operators might endeavor to evade stipulations of the Kettleman Hills agreement by purposely drilling deep into the oil sand and subsequently claim that it would be impossible to shut down in compliance with regulations. Operators following developments in the Kettleman Hills Field are closely watching the outcome of several effect on the future status of the Kettleman Hills agreement. George F. Getty wells being drilled on fee-owned acreage as this work will probably exert some is starting a new well on the Irwin lease in the middle dome in Section 20-23-19 and since drilling on this lease cannot be prevented by the Kettleman Hills agreement because the property is owned in fee it is not at all improbable that the Standard Oil Co. may drill an offset in Section 29-23-19. This might ultimately force the Petroleum Securities to start an offset under the Burbank prospecting permit in Section 20-23-19 unless the Department of Interior discounted the drainage factor. A similar situation in the north dome where the Amerada Petroleum Corp. is making preparations to drill on Arthur King's 160 acres in Section 29-21-17. This well is located close to the projected axis of the structure and looks good for production, especially in view of the good saturated oil sand cored by the Milham Exploration Co. on the Kennedy lease in Section 28-21-17. The Associated and Superior Oil companies are also starting new wells on the north dome which may precipitate the drilling of several offsets. The former is hauling in material for a new rig in Section 35-21-17 and the latter is making preparations to drill in Section 29-21-17. This drilling on fee-owned acreage will not become a factor of importance within the next six months, as all three of the wells are just getting under way, but it may ultimately affect the Kettleman Hills agreement.

Santa Fe Springs

Completions at Santa Fe Springs during the past several weeks have been less numerous than heretofore with the result that field production is somewhat below the anticipated level. Irrgularity of completions has caused several violent breaks in production curves due to the sensitive condition of field production and this condition should continue for some time. Completions in the deep zone have been retarded due to progressive deeper drilling but this field is due for another peak at a later date unless the gas law becomes effective in the meantime. There are still 214 incompleted drilling projects under way and their completion is bound to exert a substantial effect on field production if drilling and production activities continue unabated. Very few wells have been staretd during the past month or two with the O'Connell zone as their objective, and many projects originally scheduled for completion in this zone have been transferred over for completion in either the Clarke or Hathaway zones due to the prevailing flush condition of these horizons. Daily production during the past week strengthened somewhat but is still below the 1929 peak although it is within striking distance.

Probably the most important project under way in Santa Fe Springs is The Texas Company's No. 10-A Patterson, which is believed to have discovered a hitherto unknown horizon. This well, which is now down 8,538 feet, has been cored practically solid after leaving the 8,285-foot level, at which point a rather promising oil sand was picked up. No gray sand has been logged between 8,285 feet and the present bottom, 8,538 feet, and the absence of any suspicious gray sand confirms the prevailing opinion that clean substantial production may be anticipated upon completion. It is a little too early to state definitely that The Texas Company has actually discovered a new horizon due to the fact that a survey indicates a deviation from the vertical. All indications, however, tend to indicate that a new zone has been encoun-

SHOW IN CLARE COUNTY WILDCATS NORTHEAST OF MT. PLEASANT FIELD

By Special Correspondent

MUSKEGON, Mich., Oct. 5.—Discovery of a considerable volume of gas and a show of oil in the Marshall formation in two wildcat wells in Clare County about 15 miles northeast of the Mount Pleasant Field held the interest of oil operators in Michigan last week.

A flow of gas which was reported gauged at 3,800,000 feet, was struck in James A. McKay's No. 1 Fee, NE NW, Section 6-17n-4w, Grant Township, Clare County. The reported depth was 1,400 feet although the exact depth has not been announced. After being allowed to blow open for a day it tested 3,000,000 feet and operators were preparing to complete it at the present depth, move over a short distance and drill another test.

The oil show was struck in the Decem Development Co.'s No. 1 Frank Salters, NE NE, Section 33-18n-6w, Fremont Township. The Marshall was reported struck 53 feet higher in this well than in the Mount Pleasant Field. It was estimated that a 10 or 15-bbl. well might have been made of the Marshall show but drilling is to be continued to the Traverse and Dundee. The Salters well is about 9 miles west of the McKay well and has a surface elevation 110 feet higher.

Mount Pleasant Field

More than 1,000 bbls. of initial production was added to the record of the Mount Pleasant Field with three successful completions for the Pure Oil Co. The largest was No. 1-A. State of Michigan, SW NE, Section 12-14-3, Chippewa Township, Isabella County. It made 360 bbls initial production in the Dundee at 3,515-28 feet. Dundee was topped high at 3,488 feet and the bottom of the hole is at 3,563 feet.

No. 1-B State of Michigan, NW NW, Section 18-14-2, Greendale Township, Midland County, made 300 bbls. initial at 3,547 feet. Dundee was topped at 3,517 feet and completed at 3,575 feet.

No. 3-B Glenn M. Reem, NE SE, Section 12-14-3, Chippewa Township, came in as a 200-bbl. initial producer at 3,539-56 feet, Dundee was topped at 3,508 feet and the bottom is 3,583 feet.

Another 400-bbl. initial production has been added by J. C. Arthurs' No. 4 Bailey-Hall, NW NE, Section 13-14-3, Chippewa Township, which was at 3,575 feet but is to be drilled deeper.

Completion of the Wittmer Oil & Gas Co.'s No. 1 West, SE NE, Section 25-15n-4w, Isabella Township, Isabella County, as a 30-bbl. producer in the Dundee, has resulted in activity in this direction.

New wells which will be drilled include: Wittmer Oil & Gas Co. on the Muterspaugh farm in Section 24; Hol-

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tered and if subsequent development confirms this probability, the new zone will be designated as the Patterson sand.

Eight wells were on production in the Santa Fe Springs Field during the past week, one of which was somewhat of a freak. This was the General Petroleum Corp.'s No. 179-G, which came in making 5,000,000 feet of wet gas daily and only a small quantity of crude oil. This new well, which is flowing under a pressure of 1,050 pounds, was bottomed in the Clarke zone at 7,438 feet and has 1,174 feet of open hole below the 6⅝-inch water string landed and cemented at 6,264 feet. In addition to No. 179-G. the General Petroleum Corp. finished Nos. 212 and 160-C on the Santa Fe lease. The former came in flowing 2,955 bbls. daily upon recompletion at 8,000 feet, while the latter, a new well, is good for 1,730 bbls. per day from 7,135 feet, the hole having been plugged back from 7,172 feet. No. 212 Santa Fe was given a preliminary production test early in September, at which time it showed an initial of 980 bbls. daily from 7,520 feet. It was subsequently killed, however, and carried down to its present depth. George F. Getty, with 20 strings of tools to his credit at Santa Fe Springs, successfully recompleted No. 27 Baker doing 3,210 bbls. of clean 33.9 gravity oil and 5,400,000 feet of wet gas daily from 7,967 feet, the hole having been finished with a 3-inch liner carrying 214 feet of perforated. This well was originally completed in the Clarke zone last July doing 600 bbls. per day from 7,703 feet.

O. J. Rohde also listed a satisfactory completion during the past week as his No. 3 York, a new well, registered an initial daily production of 2,865 bbls. of clean 33.9 gravity oil and 2,150,000 feet of wet gas upon completion at 7,170 feet. The Standard Oil Co. increased its list of producers at Santa Fe Springs by finishing three wells. These were No. 9 Koontz and Nos. 21 and 24 on South Whittier Community lease. No. 9 Koontz, which is doing 2,544 bbls. of clean 33.9 gravity oil daily from 7,991 feet, is a recompletion, having been originally finished several weeks ago flowing 550 bbls. per day from 7,825 feet. No. 21 South Whittier Community was also a recompletion as it was originally finished doing 630 bbls. per day in the O'Connell zone at 6,448 feet last May. It was returned to production a few days ago flowing 3,178 bbls. after being redrilled and deepened to the Clarke zone at 7,939 feet. No. 24 South Whittier Community on the other hand was a new well brought in flowing 2,310 bbls. per day from 7,982 feet. The Union Oil Co. still heads the list from a production standpoint at Santo Fe Springs with 48,500 bbls. daily, followed by the General Petroleum with 48,000 bbls., Standard with 38,000 bbls., The Texas Company with 24,000 bbls. and George F. Getty with 20,000 bbls.

Long Beach

The Long Beach Field of Los Angeles Basin, which is correctly referred to as Old Reliable, yielded seven new wells during the past week. This field, one of the most remarkable areas ever opened in California, has maintained a consistent daily production for several years as the enormous thickness of oil bearing formation, which on top of the structure approximates 2,500 feet of unbroken oil sand, is naturally conducive to substantial long-lived production. The daily production for July and August is indicative of its consistency, the output for these two periods being 173,781 bbls. and 175,044 bbls., respectively. During September, daily production has averaged around 170,000 bbls. The Allied Petroleum Corp. increased its list of producers at Long Beach this week by completing No. 1 Garrison doing 615 bbls. daily from the Miocene at 7,219 feet. Dabney & Johnston listed two wells for completion, one of which, No. 17 Signal, a recompletion, was finished about 10 days ago. This well required several days to reach its maximum potential, however, and it is being officially completed as a 1,160-bbl. producer from 7,478 feet, the output having entirely cleaned up during the course of the production test. No. 46 Signal, Dabney & Johnston's latest completion, was a new well brought in flowing 871 bbls. of clean 30.4 gravity oil daily. This project, bottomed at 6,806 feet, was finished with a 4¾-inch liner carrying 402 feet of perforated, with the 8⅝-inch oil string landed and cemented at 6,405 feet.

The Hancock Oil Co.'s No. 18 Signal was the largest well finished at Long Beach during the week as it showed an initial daily output of 1,290 bbls. from 7,452 feet. Otis Hoyt's No. 4 also registered satisfactory production as it tanked 1,275 bbls. during the initial 24-hour test from 7,176 feet. Hoyt's No. 3 Signal, which preceded No. 4 into production by several days, is flowing 1,030 bbls. of clean 29.5 gravity oil daily from 7,729 feet. The Richfield Oil Co., which is doing very little work in the Long Beach Field due to completion of its development campaign in that area, finished No. 8 R. C. doing 285 bbls. daily from 7,550 feet during the latter part of September but the output did not clean up until a few days ago. It is at present doing 510 bbls. of 29.2 gravity oil which is cutting 3 per cent. J. O. Seeple has just finished No. 6 Maltby at 7,205 feet but it is rather slow in getting under way and may require another day or two before cleaning up. No. 2 Davis of the Graham & Loftus Oil Co. came in flowing approximately 300 bbls. daily from 6,800 feet but subsequently sanded up and is at the present time being cleaned out preparatory for early completions.

Increased Work in Potrero

Development work in the town-lot section of the Potrero Field of Los Angeles Basin is rapidly gaining momentum and it is quite probable that there will be at least 15 strings of tools in operation within the next fortnight. The Associated Oil Co. will begin making hole in two new wells within the next few days and should be followed by several other operators soon thereafter. Blinn & Bergman have already spudded in their initial well in the townlot area and a number of others, including T. F. Barton, Cypress Petroleum Co., Globe Lease & Royalty Co. and Sunset Pacific Oil Co., are expected to begin making hole shortly as they are all erecting one or more new rigs. George F. Getty has staked seven new locations and grading is already under way on five of the lots selected for immediate work. The Richfield Oil Co. which has a large block of community leases, is also starting several new wells and should begin rig construction within the next day or two. York & Lockhart have succeeded in recompleting their No. 1 Blinn & Harlin and this project is flowing 1,250 bbls. per day from 3,855 feet. George F. Getty has also succeeded in putting his No. 1 Parks back on production and it is doing 760 bbls. of 43.8 gravity oil daily. This well was mudded off last week by York & Lockhart when they killed their No. 1 Blinn. These two wells are about 200 feet apart but a survey indicated that the bottom of the holes were only about 75 feet apart, indicating a substantial deviation from the vertical. The Brea Canyon Oil Co. successfully finished its No. 46 Olinda in the Brea Olinda Field during the past week and this new well is pumping 180 bbls. of 22.1 gravity oil from 4,699 feet.

Ventura Avenue

Three new wells were finished in the Ventura Avenue Field during the past week, all of them standing to the credit of the Associated Oil Co. The largest and most satisfactory completion was No. 107 Lloyd, which came in flowing 3,220 bbls. of pipe line oil and 3,400,000 feet of gas daily from 7,297 feet. No. 58 Lloyd blew in late in the week doing 1,770 bbls. daily from 7,744 feet after the crew had made a valiant attempt to retard completion by circulating heavily fortified drilling mud to kill the heavy gas pressure. No. 7 McGonigle was a rather unsatisfactory completion as the output, 620 bbls. daily from 6,901 feet, is cutting in excess of 25 per cent. The Associated and Shell have several other potential producers nearing completion in this field at the present time and unless something unforeseen develops three additional wells should be finished within the next few weeks. The Texas Company completed another new well in the South American Field of Ventura County this week but, like its immediate predecessor,

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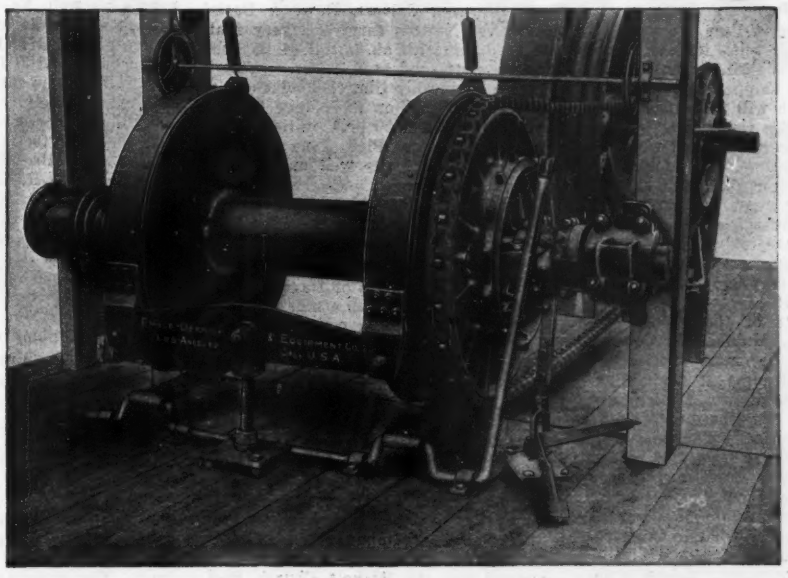
IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well location—	S-T-R	Depth	Status
Union, No. 1 Buel Canyon, Santa Barbara Co.	X- 7-31	1,806	redrilling
Western Gulf, No. 2 Gaviota, Santa Barbara Co.	X- 5-33	1,711	sd. sh. drilling
Standard, No. 1 Point Conception, Santa Barbara Co.	X- 5-34	2,428	cleaning out
Standard, No. 1 Point Arugello, Santa Barbara Co.	35- 6-36	1,727	sd. sh. drilling
Gaviota Oil Co., No. 1 Lompoc, Santa Barbara Co.	9- 7-35	1,375	fishing
Barnsdall, No. 3 Goleta, Santa Barbara Co.	1- 4-30	2,490	abandoned
Calif. Oil Prod. No. 1 San Marcos, Santa Barbara Co.	3- 4-28	1,030	fishing
Carey, A., No. 1 Goleta, Santa Barbara Co.	1- 4-28	Rig	rigging up
General Pet., No. 1 Goleta, Santa Barbara Co.	21- 4-28	4,533	gas well—idle
General Pet., No. 2 Goleta, Santa Barbara Co.	21- 4-28	Rig	rigging up
Petroleum Securities, No. 1 Goleta, Santa Barbara Co.		5,100	br. sh. drilling
Tannehill, L. B., No. 1 Elwood, Santa Barbara Co.	24- 4-29	190	sd. drilling
General Pet., No. 1 Capitan, Santa Barbara Co.	5- 4-30	1,450	deepening
Shell, No. 1 Orella, Santa Barbara Co.	36- 5-31	6,184	abandoned
Standard, No. 1 County Farm, Santa Barbara Co.		...	location
System Oil Co., No. 1 Orcutt, Santa Barbara Co.	36-10-34	4,297	oil sand
Keystone Oil Co., No. 1 Santa Maria, Santa Barbara Co.	33-10-34	3,860	br. sh. drilling
Wildcat Oil Co., No. 1 Santa Maria, Santa Barbara Co.	20-10-35	2,730	br. sh. drilling
Keystone Oil Co., No. 1 Surf, Santa Barbara Co.	18- 7-35	2,901	sd. sh. drilling
Channel Oil Co., Well No. 1, Santa Barbara Co.	29- 4-27	6,304	suspended
Channel Oil Co., No. 1 Fellowship, Santa Barbara Co.	29- 4-27	2,140	sespe, drilling
Pacific Western, No. 1 Gibraltar, Santa Barbara Co.	14- 5-27	932	sd. sh. drilling
Shell, No. 1 Summerland, Santa Barbara Co.	18- 4-25	mtl.	building rig
Continental, No. 1 Carpenteria, Santa Barbara Co.	33- 4-25	4,130	gas well—idle
Continental, No. 2 Carpenteria, Santa Barbara Co.	33- 4-25	4,460	cleaning out
Standard, No. 5-9 Staticoy, Ventura Co.	10- 2-22	8,154	fishing
American Oil Co., No. 1 Camarillo, Ventura Co.	33- 2-20	1,210	suspended
Smith & Finch, No. 1 Camarillo, Ventura Co	5- 1-20	1,112	hd. sd. drilling
Bolsa Chica, No. 1-A Temescal, Ventura Co.	4- 4-18	930	hd. sd. drilling
Associated, No. 1 Rincon, Ventura Co.	19- 4-24	mtl.	building rig
Miley, E. J., No. 2 Red Mountain, Ventura Co.	7- 3-23	1,842	hd. sd. drilling
Shell, No. 1 Simi, Ventura Co.	31- 3-17	3,925	abandoning
Continental, No. 1 Sulphur Mountain, Ventura Co.	21- 4-22	3,765	suspended
Continental, No. 2 Sulphur Mountain, Ventura Co.	22- 4-22	6,740	suspended
Continental, No. 3 Sulphur Mountain, Ventura Co.	21- 4-22	3,612	hd. sd. drilling
Lockwood Oil Co., Well No. 1, Ventura Co.	28- 8-21	516	hd. sd. drilling
Milham Expltn., No. 1-A Buttonwillow, Kern Co.	8-28-23	4,662	gas well—idle
Milham Expltn., No. 2 Buttonwillow, Kern Co.	8-28-23	2,730	gas well—idle
Milham Expltn., No. 3 Buttonwillow, Kern Co.	8-28-23	2,694	gas well—idle
Milham Expltn., No. 4 Buttonwillow, Kern Co.	6-28-23	2,670	gas well—idle
Milham Expltn., No. 5 Buttonwillow, Kern Co.	5-28-23	2,500	gas well—idle
Milham Expltn., No. 6 Buttonwillow, Kern Co.	8-28-23	2,676	gas well—idle
Milham Expltn., No. 7 Buttonwillow, Kern Co.	6-28-23	2,720	suspended
Milham Expltn., No. 8-A Buttonwillow, Kern Co.	8-28-23	2,673	gas well—idle
Milham Expltn., No. 9 Buttonwillow, Kern Co.	8-28-23	4,509	reaming
Milham Expltn., No. 10 Buttonwillow, Kern Co.	8-28-23	2,672	suspended
Elmer Oil Co., No. 1 Shafter, Kern Co.	8-28-25	6,067	suspended
Elmer Oil Co., No. 1 Bena, Kern Co.	15-30-30	3,302	hd. sd. drilling
Elmer Oil Co., No. 1-A Rosedale, Kern Co.	33-29-26	4,960	sd. sh. drilling
General Pet., No. 1 Rosedale, Kern Co.	13-29-26	1,643	gr. sd. drilling
The Texas Co., No. 1 Edison, Kern Co.	23-29-29	1,598	hd. sd. drilling
Symark Oil Co., No. 1 Edison, Kern Co.	24-29-29	2,104	br. sh. drilling
Heyd, Frank, No. 1 Edison, Kern Co.	26-29-28	...	material
Shell Oil Co., No. 1 Lerdo, Kern Co.	5-29-27	4,628	hd. sd. drilling
Union, No. 2 San Emidio, Kern Co.	5-10-21	3,666	suspended
Currency Pet. Co., No. 1 Jacalitos, Fresno Co.	28-21-14	2,371	sd. sh. drilling
Currency Pet. Co., No. 2 Jacalitos, Fresno Co.	14-21-14	350	suspended
Hornaday & Huggins, No. 1 Kerman, Fresno Co.	32-14-18	4,916	fishing
Rio Grande Oil Co., No. 1 Kerman, Fresno Co.	14-13-17	Rig	rigging up
Shell Oil Co., No. 2 Westhaven, Fresno Co.	26-19-18	3,070	cemented
Shell Oil Co., No. 4 Westhaven, Fresno Co.	17-19-19	3,612	sd. sh. drilling
Cates Oil Co., No. 1 Joaquin Ridge, Fresno Co.	7-19-15	114	suspended
Oceanside Oil Co., No. 1 Krayenhagan, Fresno Co.	33-22-17	138	suspended
Petroleum Securities, No. 1 Huron, Fresno Co.	20-20-16	695	suspended
Petroleum Securities, No. 2 Huron, Fresno Co.	28-20-16	6,450	cemented
Pismo Dome Oil Co., No. 2 Pismo, San Luis Obispo Co.	5-32-13	285	sd. drilling
Union, No. 1 Huasna, San Luis Obispo Co.	34-32-15	3,940	redrilling
Union, No. 1 North Huasna, San Luis Obispo Co.	12-32-14	4,430	br. sh. drilling
Midwest Refining Co., No. 1 Huasna, San Luis Obispo Co.	34-31-15	2,212	pipe froze
Panorama Oil Co., Well No. 1, San Luis Obispo Co.	7-31-21	4,019	cleaning out
Paso Robles Synd., No. 1 Creston, San Luis Obispo Co.	27-27-11	3,361	br. sh. drilling
Colusa Oil Co., Well No. 1, Colusa Co.	31-15- 4	635	hd. sd. drilling
North Counties Oil Co., Well No. 2, Humboldt Co.	36- 2- 1	2,205	suspended
Humboldt Oil Co., Well No. 1, Humboldt Co	6- 2- 1	3,041	suspended
Applegate & Renshaw, Well No. 1, Merced Co.	24- 6-10	3,750	suspended
Kuhns, H. L., Well No. 1, Merced Co.	8-12-19	660	suspended
Foster & Hamil, Well No. 1, Alameda Co.	21- 3- 3	1,150	hd. sd. drilling
Producers Oil Co., No. 1 San Lucas, Monterey Co.	30-21- 9	...	material
Shell, No. 1 Dudley, Monterey Co.	15-22- 9	4,000	coring
Chessher, H. B., No. 1 Dudley, Monterey Co.	8-22- 9	230	sd. drilling
Union, No. 1 King City, Monterey Co.	8-22- 8	2,079	hd. sd. drilling
Standard, No. 1 King City, Monterey Co.	23-22- 7	1,116	br. sh. drilling
Continental, No. 1 Bradley, Monterey Co.	32-24-11	5,955	suspended
Brown, W., No. 1 Parkfield, Monterey Co.	15-23-14	500	suspended
Tuck Oil Co., No. 1 Los Gatos, Santa Clara Co.	15- 8- 1	852	suspended
Penn Western, No. 1 Tulare Lake, Kings Co.	24-21-18	1,143	sd. sh. drilling
Dudley Ridge Synd., No. 1 Tulare, Kings Co.	12-23-19	1,305	gas well-sh. in
Dudley Ridge Synd., No. 2 Tulare, Kings Co.	12-23-19	...	material
Porter, H. B., No. 1 Devils Den, Kings Co.	9-24-17	1,697	hd. sd. drilling
Getty, Geo. F., No. 1 Button, Madera Co.	18-13-16	...	location
Twin State Oil Co., No. 1 Soldani, Mendocino Co.	14-12- 7	829	hd. sd. drilling
Elmer Oil Co., No. 1 County, San Joaquin Co.	6- 3- 9	...	location
Barnhart Trust, No. 1 Oakdale, San Joaquin Co.	3- 2-10	261	sd. drilling
White, Ray, No. 1 Pixley, Tulare Co.	8-23-26	1,018	sd. sh. drilling

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Standard, No. 1 Hawthorne, Los Angeles Co.	5- 3-14	7,525	gr. sd. drilling
Ohio Oil Co., No. 1 Del Ray, Los Angeles Co.	21- 2-15	5,170	hd. sd. drilling
Marblehead Land Co., No. 1 Santa Monica, Los Angeles Co.	1- 2-19	Rig	rigging up
Burlington Pet. Co., No. 1 Compton, Los Angeles Co.	17- 3-13	2,204	cleaning out
Lee & Brainerd, No. 1 Rosecrans, Los Angeles Co.	17- 3-13	Rig	suspended
Big Boy Drlg. Co., No. 1 Compton, Los Angeles Co.	22- 3-13	...	material
Hanners, Geo., No. 1 Watts, Los Angeles Co.	8- 3-13	691	sd. drilling
Jackson, R. B., No. 1 Watts, Los Angeles Co.	8- 3-13	Rig	suspended
Cal. Well Drlg. Co., No. 1 Compton, Los Angeles Co.	11- 4-13	8,500	cleaning out
Archer Oil Co., No. 1 Watson, Los Angeles Co.	17- 4-13	1,502	hd. sd. drilling
Russell Oil Co., No. 2 Joughin, Los Angeles Co.	23- 3-17	2,251	gr. sd. drilling
Pomona Oil Co., Well No. 1, Los Angeles Co.	32- 1- 8	1,220	testing
Anchor Oil Co., No. 1 Puente, Los Angeles Co.	19- 2-10	4,820	suspended
Rucker, R. C., No. 1 Puente, Los Angeles Co.	27- 2-10	2,180	cleaning out
The State Co., No. 1 Puente, Los Angeles Co.	5- 2-10	Rig	rigging up
Urmi Oil Co., No. 1 Puente, Los Angeles Co.	31- 2- 8	775	redrilling
Monterey Park, No. 1 Jepson, Los Angeles Co.	25- 1-12	5,300	suspended
West, L. M., No. 1 El Monte, Los Angeles Co.	16- 1-11	760	sd. drilling
Union Oil Co., No. 1 Richfield, Los Angeles Co.	13- 3- 9	1,379	hd. sd. drilling
Southwestern Drlg. Co., No. 1 Richfield, Los Angeles Co.	21- 3- 9	5,777	recemented
Superior Oil Co., No. 1 Atwood, Los Angeles Co.	4- 4- 9	1,560	sd. sh. drilling
Coastline, No. 1 Devils Canyon, Los Angeles Co.	21- 5-17	1,200	sd. sh. drilling
Queen, J. M., No. 1 Newhall, Los Angeles Co.	22- 3-16	230	suspended
Anderson, P. B., No. 1 Hasley Canyon, Los Angeles Co.	1- 3-16	567	testing
Shell, No. 1 Bolsa, Orange Co.	18- 5-11	mtl.	building rig
Shell, No. 1 Coyote, Orange Co.	28- 3-10	5,990	sd. sh. drilling
Beard, G. F., No. 1 Brea Canyon, Orange Co.	30- 2- 9	934	suspended
Mesa Pet., No. 1 Newport, Orange Co.	21- 6-10	4,910	plug. back
Western Gulf, No. 3 Newport, Orange Co.	21- 6-10	940	sd. sh. drilling
Oil Well Eng. Co., No. 1 Newport, Orange Co.	21- 6-10	2,806	recemented
Hall Pet. Co., No. 1-A Murrietta, Riverside Co.	23- 7- 3	701	hd. sd. drilling
Hemet Pet. Co., No. 1 Ward, Riverside Co.	9- 5- 1	3,403	suspended
Imperial Valley Oil Co., Well No. 1, Imperial Co.	32-11-10	2,980	suspended
Davenport Oil & Gas Co., No. 1 San Marcos, San Diego Co.	30-12- 8	847	suspended
Turner, S. S., No. 1 Escondido, San Diego Co.	25-12- 2	2,095	sd. sh. drilling
Borderland Oil Co., No. 1 Encinitas, San Diego Co.	X-13- 4	1,072	sd. sh. drilling
China American Oil Co., No. 1 Oasis, San Bernardino Co.	17- 4- 4	...	grading

free spooling



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EMSCO STEEL EQUIPPED WELLS ARE SAFE

Muhlenberg County Looks Like Field

Production Increasing in New Western Kentucky District. Wildcat in Dickson County, Tennessee, Attracting Attention

By Whit
Staff Correspondent, Kentucky-Tennessee

OWENSBORO, Ky., Oct. 7.—Rapid strides are being made in the main producing counties in western Kentucky, as operators are anxious to get as many wells as possible connected to pipe lines before the extreme cold weather comes. A large amount of pipe and other materials needed are being put on new locations all over Ohio, Daviess, Hancock, McLean, Breckenridge, Webster, Henderson, Muhlenberg, Hopkins and other counties, so that work can continue during the winter.

During the past couple of weeks the heaviest business all around in the industry was recorded. The record wells of the field, three in number, were brought in, one each in Ohio, Daviess and Muhlenberg Counties. Neither the Muhlenberg nor Ohio County wells could be accurately measured to determine their full capacity. Such rapid development has taken place in Daviess, Ohio and Muhlenberg Counties that pipe lines and supply houses have been crowded to take care of the business offered them. With a daily production of close around 15,000 bbls. in the past week, the field looms as a record breaker.

Muhlenberg Field

The Greenville Field of Muhlenberg County is coming rapidly to the front as one of the leading fields of the Blue Grass State, and its production is increasing in a satisfactory way. Most of the development work is being done by the large operating concerns. The field was opened some months ago by the Ohio Oil Co. whose third well on the R. O. Kennedy farm came in flowing wild at a depth of 1,663 feet at only 2 feet in the sand. It is still flowing steadily through 3,000 feet of 2-inch line to the tank house at the discovery well. Probably several weeks will elapse before the well can be drilled in and completed.

Daviess County

Daviess County is not without an excellent find, as the well of Evans and Garrison, being No. 1 Davis farm, adjoining the Purcell lease, in the Red Hill district, produced 100 bbls. in 3 hours and is reported to have produced 700 bbls. in 24 hours, making it one of the best completions for the county. This well found its oil in the Jett sand, which was topped at 808 feet and drilled in 22 feet of sand. Still below this sand are other very good prospects, the Barlow and possibly the McCloskey sands.

In the Barnett's Creek Church Pool, southwest of Taffy, in Ohio County. No. 5 well of Hupp and Duff on the Mason-Bartlett farm, filled all available storage, wtih less than 5 feet in the sand. This is in the stray sand that has been such a large producer in the Bartlett and Morgan Pools, same part of the county. This well is reported to have flowed at the rate of 1,000 bbls. in 24 hours, with the bit and part of the stem in the hole. Had the tools been out of the hole it might have made a much larger showing. With the three big wells found far apart, it makes things look up in that part of Kentucky.

More Storage

W. F. McCray, general manager of the Illinois Pipe Line Co., in western Kentucky, has started the erection of a 55,000-bbl. storage tank at the pumping station at Doyle, a couple of miles east of Owensboro, to take care of the surplus accumulating recently. Should the production continue to increase as it has during the summer, it will become necessary to lay a second line from the field to Lawrenceville, Ill., the manager believes.

A shortage in tank barges also has been on lately so that the hauling by this method via the Ohio River to Louisville has caused a surplus stock to accumulate at the Doyle station.

Moving in Pipe

The Ohio Oil Co., with its vast acreage under lease in the Muhlenberg County Field, is having shipped there 11 carloads of pipe, which will be hauled while the condition of the roads will permit, and stored at places in the field where it will be convenient to future locations. Casing, oil and water line pipe are included in these shipments, and other supplies of all kinds are being brought in by truck. New rigs are to be added to the field, and everything got shipshape, so that development may go right along throughout the winter.

Favorable results of the oil activity around Greenville, Muhlenburg County, are beginning to be more noticeable. There is an endless amount of hauling, and trucks, both local and foreign, are constantly passing over the streets, moving supplies to the field. There is, also, a steady demand for houses and rooms, while boarding houses and restaurants are enjoying a steady patronage. Many oil men predict that should development of the field prove to be what is expected, the town will not be able to take care of its increas in population, unless some measures are taken to provide more accommodations for those who are sure to move in.

Week's Work

A summary of the week's work in Kentucky shows 22 completions, 20 producers with an initial production of 3,680 bbls., 1 dry hole and 1 gas well.

County—	Oil Comp.	Wells	Prod.	Dry	Gas
Ohio	15	14	3,025	0	1
Daviess	6	5	645	1	0
McLean	1	1	10	0	0
Total	22	20	3,680	1	1

Ohio County Wells

The Barnett's Church Pool, almost due west of Taffy, in northern Ohio County, has developed a big surprise by its large shallow oil wells developed in a stray sand at around 600 feet. This pool was opened by R. W. McMahan, on the Church 3-acre lot, early in the month, and reported at 150 bbls. initial, and work was started at once on adjoining leases as offsets to the good producer, but the second attempt to find oil on the 3-acre tract proved a failure although the surrounding acreage is developing some of the best wells found in any of the pools of Ohio or adjoining counties, and the bringing in of the Church lot duster was one of the freaks of the oil game, that happen quite often in Kentucky. No. 7 on the Mason-Bartlett farm, which adjoins the Church lot, is also a large producer but shut in on account of all tankage being filled and the well will be held back until the new 4-inch pipe line is completed, as there is a large number of storage tanks on the lease, filled daily by the six other completions on the lease. It is reported that Nos. 5 and 6 on the lease, both of which are large producers, can fill the present storage in a very short time. No. 7 on this lease is better than 350 bbls., but shut in.

In the same pool and adjoining the Mason-Bartlett farm and the Church lot, the Rex-Pyramid Oil Co. is rushing its completions, having had 8 strings of tools at work on the Sallie Hoover farm. Eight good producers have been brought in since the last review, Nos. 3, 4, 5, 6, 7, 8, 9 and 10, with estimated production of 150 200, 150, 150, 200, 200, 350 and 450 bbls., respectively. Hupp and Duff's No. 6 Mason-Bartlett is better than 500 bbls. initial.

Deanfield Area

In the Deanfield area Russell & Rudolph's No. 8 on the H. C. Greer farm, is reported around 50 bbls. initial. In the Fordsville area Calvert, Rowe & Bates' test on the Newton farm is a very shallow producer with an initial of 25 bbls. from the Jett sand at 339 feet.

In the Friendship Church Pool, the Sirman's Co.'s No. 26 on the Nancy Farmer is reported around 50 bbls. initial.

Missouri-Kansas Pipe Line Co. has brought in a nice gas well on its lease in the Deanfield area.

In the vicinity of Oklahoma, James C. Ellis and others' No. 3 on the Clay Ford farm, is rated at 20 bbls. initial.

Daviess County Wells

The Owensboro Field of Daviess County comes to the fore with a nice producer, the largest found in the county for many months. This new well was drilled by Evans & Garrison and is No. 1 on the Davis farm, adjoining the Purcell farm, in the Red Hill Pool. This well flowed 100 bbls. in three hours, and when given a first 24-hour test put out 750 bbls. in tanks, according to report, but was reported as 500 bbls. The production of this end of the field goes toward the Browns Valley tanks and pump station of the pipe line company, hence can be relieved quickly to a large extent and not congested like the Barnett Church Pool, in Ohio County. The Davis well was given a 200-quart shot.

In the Jones Pool, Stimson and Robbins' No. 5 on the Fireline farm, is reported at close to 50 bbls. initial.

The Petroleum Co.'s No. 4 Tony Hansford farm, in the Utica area, reported at 30 bbls. initial and the Eastern Gulf Oil Co.'s No. 9 M. C. Ruby, in the Red Hill Pool, is rated at 30 bbls. initial, while Roy Hogan and others found a dry hole on the A. C. Atherton farm.

Creek Drilling Co.'s No. 2 on the Bob Hamilton farm, in the St. Joseph area, in the western part of the county, is reported good for 25 bbls.

McLean County Well

The Ohio Oil Co.'s No. 3 on the D. B. McManama No. 2 farm, 4 miles west of Utica, in McLean County, pumped 10 bbls. with No. 4 drilling.

The E. M. Treat well on the James Bandy tract to the north of the Brashere well is due to be in during the new few days. It has reached a depth of 1,565 feet. The well has just passed through the 6 feet of sand on top of the Mississippi and the pay in all the wells has been obtained at a depth varying from 122 to 185 feet in.

The Missouri-Kansas Co.'s well at Cleton, east of Greenville on the Volney Fortney farm, has reached a depth of 1,990 feet and is fishing at present for the tools and the bailer. The Pencil Cave above which is not cased off is adding to the difficulty. This well is thought to be within a very few feet of the pay according to the company's geologists.

A rig belonging to Dahlgren & McMahan of Owensboro is now on the Ed Hill farm, 2½ miles northeast of the town of Drakesboro. This is the rig that will drill the deep test for the Wickliff Coal Co. in that vicinity. The rig will be moved to a new location as the company is not satisfied with the present location.

The Ohio Oil Co.'s deep test on the Barnhill farm, in Hopkins County, has reached a depth of 1,584 feet and is engaged in drilling up a bailer. This well is 2½ miles southeast of White Plains.

George Snyder and others of Hopkinsville are drilling at 400 feet on the Arch Parker 14-acre tract.

Simpson Brothers drilling for Ellis & Young on the Ed Tett are drilling ahead at 1,100 feet. This well is east of the Brashere and northeast of the Ohio company's big well, No. 3 R. O. Kennedy.

Jack Akers is drilling for Ellis & Young on the Rice Brothers. or Preacher Woodson, at 1,100 feet. This is the second well on this farm. The first well is holding up nicely. H. C. Smith drilling for Ellis & Young on the Duke is drilling at 1,300 feet. This well is north of the Rice Brothers' well. The Ohio Oil Co. on the R. L. Kennedy is drilling another at 1,125 feet. This well also is north of the Rice Brothers and the Dukes well. The Missouri-Kansas Co. has moved from its No. 1 John Corley to the southwest corner of the same farm, about one-half mile where it is about 150 feet deep on the second well. No. 1 Corley is a 10-bbl. pumper.

Acquire Acreage

Ellis & Young have recently acquired extensive acreage to the south and east of their present production of the Rice Brothers or Preacher Woodson farm. Their new holdings border the Rothert or Furnace land on the north and northeast.

A test in all probability will soon be drilled on the Hugh Lee farm to the south, a trifle west of the large Rothert tract. The leases are held by George Hill of Weir, and negotiations for a test are going forward. The location will be about one-half to three-quarters of a mile south of the Jackson well drilled by the Ohio Oil Co. This well gave the first real encouragement for a field in Muhlenberg. It is reported that George Snyder of Hopkinsville will possibly drill the test. Mr. Snyder has had considerable oil experience, not only in the United States but the island of Cuba as well. He is at present drilling on the Arch Baker tract.

Walter Sargent of Minneapolis, Minn., has been looking over the new field with a view of entering the activity. Mr. Sargent has done considerable development not only in Illinois and Indiana, but in Kentucky. He has acquired a large block of promising acreage north of Greenville and will drill one or two tests.

The 6,000,000-foot gasser which the Missouri-Kansas Co. drilled in Hopkins County is causing quite a flurry in that section. The gas sand was topped at 1,125 feet and drilled in only 2 feet. It is thought that if the well was drilled a little deeper it would greatly increase the gas production. This well was drilled on the Lester farm, 15 miles west of Madisonville and about 1½ miles north of Kirkwood Springs. The Missouri-Kansas Co. is now moving this rig about 1,500 feet south on the Richards farm, where it will drill another test. Ellis & Young are getting interested in this territory and are taking over some acreage across the river in Caldwell County. Lanyon & Gaither are making ready to let a contract for a test to the east of the big gasser. This test will probably be drilled by Frank Leatherman, a veteran contractor from Illinois, who has drilled many wells for the Ohio Oil Co.

Hopkins County

The Ohio Oil Co. is making ready to resume drilling on its well at "Beulah" in Hopkins County. A scarcity of water forced a shutdown but this has been remedied.

P. J. Patton, an attorney of Akron, Ohio, has acquired the big Bennewits lease to the north and west of Greenville in Muhlenberg County and it is reported he will drill at once.

(Continued on Page 266)

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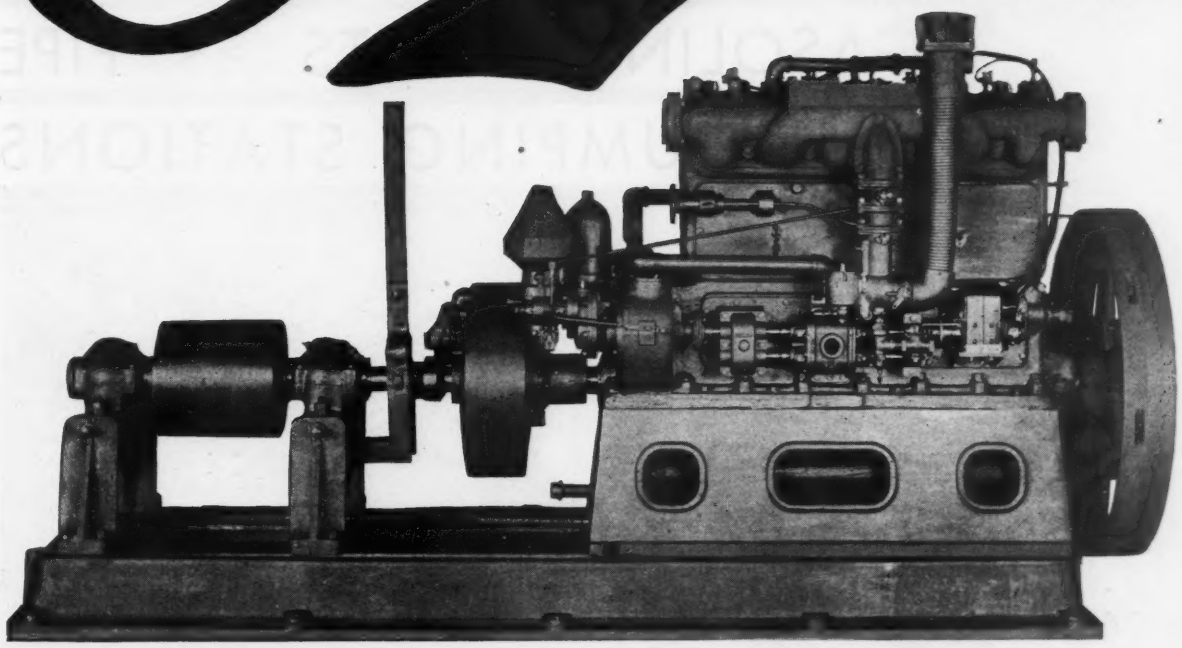

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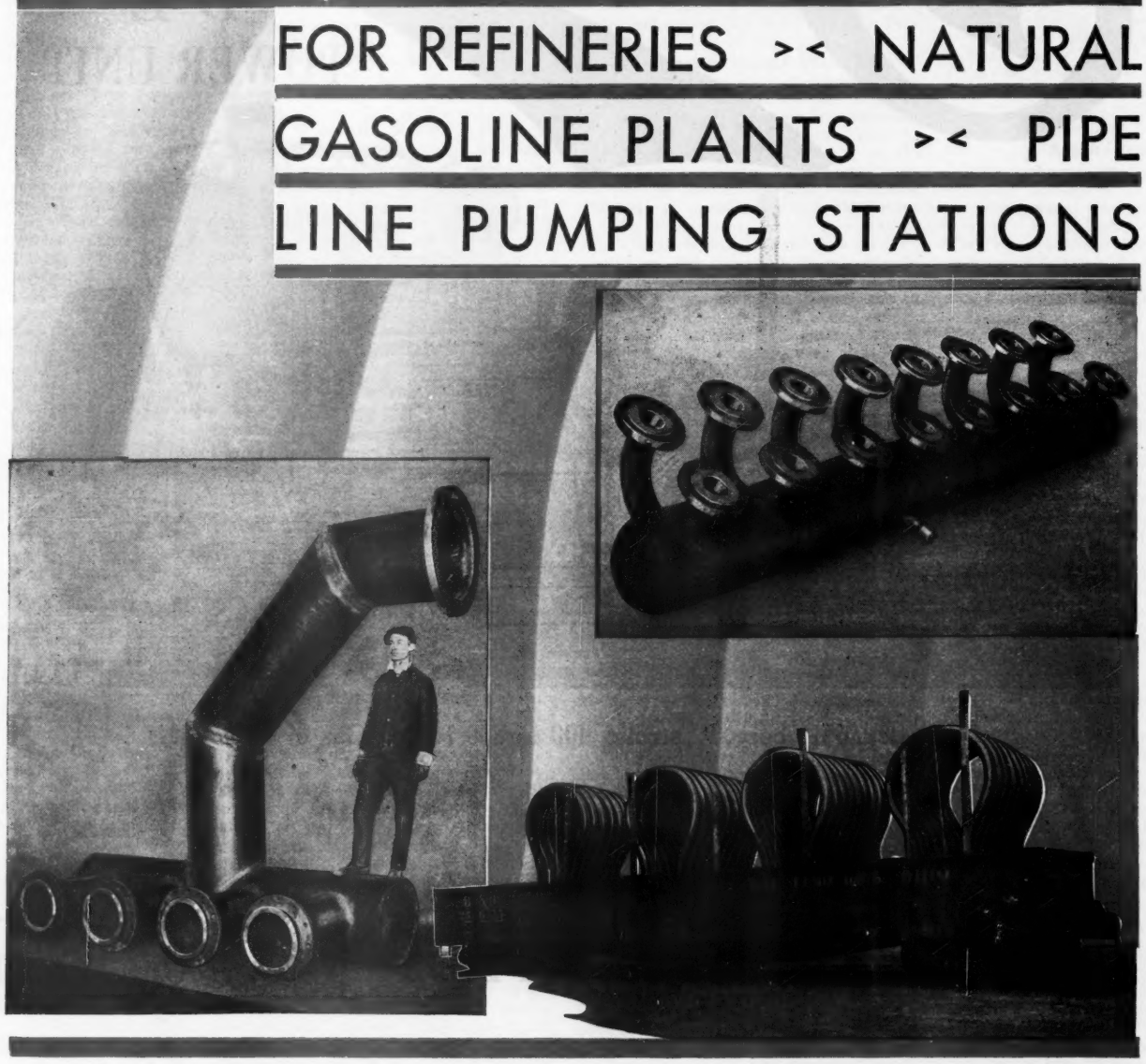

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Southeast Ohio New Production Gain

Operations in Meigs County Holding Up. New Work in West Virginia Old Districts. Pennsylvania Completions

By D. S. Wakenight
Staff Correspondent, Eastern Fields

PITTSBURGH, Pa., Oct. 7.—In the eastern fields there was very little difference at the close of September and the close of the preceding month in the number of wells completed. However, the completion of several large wells in the deep sand territory in southeast Ohio brought an increase of new production of 1,036 bbls.

In the SW Section 4, Pike Township, Coshocton County, the Preston Oil Co. has completed and shot in the Clinton sand a test on the Dorothy and Lottie Rine farm. It produced 21 bbls. the first 24 hours.

In the SW Section 9, Rush Creek Township, Muskingum County, Dughart and others have completed on the Ora Gillespie farm a gasser in the Clinton sand good for 6,800,000 feet.

Operations in Meigs County are holding up fairly well. In the NW of Sutton Township, the Preston Oil Co. completed in the Mitchell sand a second test on the May Davis farm. It is a 10-bbl. pumper. In the NE Section 11, same township, the Southern Ohio Petroleum Co. completed in the Cow Run sand a second test on the Peter Karr farm. It is a duster. In the SW, Section 29, Salisbury Township, J. H. Cochran and others completed a second test on the Roy Sanbury farm. At a depth of 1,500 feet it has been abandoned. In the NW Section 10, Sutton Township, Keith Thompson and others completed in the Cow Run sand a test on the Arthur Beedle farm. It is dry and abandoned.

Starting New Work

In the SW Section 11, Sutton Township, the Southern Ohio Petroleum Co. is drilling a test on the John Carnahan farm. In Lot 283, Sutton Township, B. M. Tyree has started to drill on the William R. Lott farm. B. M. Tyree & Co. have started to drill on the A. E. Carnahan farm.

Inside of Alliance corporation, Stark County, the Hill Top Oil Co. completed in the Berea grit a duster on the Albert Mill farm. In the NW Section 11, Sutton Township, Meigs County, John M. Hazlett and others are starting a second test on the Belle Spencer farm. In the NW Section 18, the Preston Oil Co. is drilling a second test on the Mary Davis farm. In Section 11, Sutton Township, H. B. Godard & Co. have started to drill on the A. E. Carnahan farm.

In the SW Section 33, Falls Gore Township, Hocking County, the Griffin Producing Co. completed No. 7 on the Dora Thomas farm. It produced 25 bbls. the first 24 hours after shot in the Clinton sand. In the NE Section 26, Bearfield Township, Perry County, the Wieber Oil Co. completed a gasser good for 500,000 feet in the Clinton sand on the S. H. Pettet farm.

In the SW of Ward Township, Hocking County, the Payne Oil & Gas Co. completed and shot in the Clinton sand a test on the J. G. Payne farm. It produced 30 bbls. the first 24 hours. In the SW Section 21, Jackson Township, Knox County, the Arkansas Fuel Oil Co.'s No. 22 on the L. V. Dugan farm is a 5-bbl. pumper in the Berea grit.

Athens County

In Tee Township, Section 6, Athens County, the Ohio Fuel Gas Co. has completed a 2-bbl. pumper in the Berea grit on the Elza Enlow farm. At New Mansfield, Section 1, Waterloo Township, the Ohio Fuel Gas Co. has a gasser in the Berea grit good for 1,000,000 feet on the T. H. Hoover farm.

In the SE Section 8, Perry Township, Muskingum County, the Wittmer Oil & Gas Properties completed a test on the C. F. Cullens farm. It is a gasser good for 400,000 feet in the Red Medina sand. It got a light show of oil in the stray above the Clinton sand but was drilled on through the Clinton to a total depth of 4,526 feet.

At Bollin Mills, Section 3, Knox Township, Vinton County, W. J. Sperry & Co. have a 3-bbl. pumper in the Berea grit on the Harvey Brooks farm. In the SE Section 6, Cross Creek Township, Jefferson County, the Decker Oil Co. completed in the Berea grit a duster on the Mrs. Anna Daugherty farm.

In Section 8, Palmer Township, Washington County, Robert W. Tunney & Co. completed No. 7 on the Munroe E. Leasure farm. It produced 30 bbls. the first 24 hours after completed and shot in the Cow Run sand. At Bollin Mills, Knox Township, Vinton County, the Powers Oil & Gas Co. has a 2-bbl. pumper in the Berea grit at a second test on the Cameron S. Clark farm.

Medina County

In Lot 2, Section 12, Chatham Township, Medina County, the East Ohio Producing & Refining Co. has a 20-bbl. producer at its No. 6 on the Steve and Anna Jelensics farm. In Lot 3, Section 10, same township, the Oko Oil & Gas Co. completed in the Berea grit No. 29 on the Sanford-Watson farm. It produced 10 bbls. the first 24 hours.

WEST VIRGINIA

On Devil Hole Creek, Grant district, Ritchie County, the Eastern Refining & Producing Co. completed No. 23 on the A. Rutherford heirs farm. It is a small gas well in the Big Injun sand. In Geary district, Roane County, the United Fuel Gas Co.'s No. 3,989 on the James McLaughlin farm is a gasser in the Big Injun sand good for 1,500,000 feet. In Williams district, Wood County, C. S. Reed completed in the Big Injun sand No. 12 on the C. S. Reed farm, located on Plum Run. It is a duster.

In Central district, Doddridge County, the Philadelphia Oil Co. completed in the Gordon sand a duster on the Edward Maxwell farm. The location is 1,500 feet east of the same company's second test on the C. P. Hudson heirs farm.

On Big Paw Paw Creek, Paw Paw district, Marion County, the Owens Illinois Glass Co. completed in the Fifth sand a second test on the Martha E. Robinson farm. It is a fair gasser. On the north fork of Hughes River, Grant district, Ritchie County, B. C. Deems & Co. completed a second test on the Andrew Hall farm. It is a gasser in the Keener sand good for 4,000,000 feet a day.

On Green Creek, Walton district, Roane County, the Clifton Oil & Gas Co. completed in the Big Injun sand No. 3 on the E. H. Summers farm. It is a gasser. On Camp Creek, Poca district, Kanawha County, the Chartiers Oil Co. completed a duster in the same formation on the Siegel Shaffer farm.

In Geary district, Roane County, the Virginian Gasoline & Oil Co. completed No. 3 on the John Hunt farm, showing for a 10-bbl. pumper. In Henry district, Clay County, the same company completed No. 3 on the J. and L. J. Reed farm, estimated good for 20 bbls. after shot.

On Hartley Run of Sandy Creek, Washington district, Jackson County, the Virginian Gasoline & Oil Co. completed in the Berea grit a duster on the Amos Mitchell farm. It is 2,500 feet southeast of the Heck Oil Co.'s test on the C. O. Parrish farm.

On Reedy Creek, Reedy district, Roane County, the Hope Construction & Refining Co. has the rig completed for the second test on the P. F. Enoch farm. The same company has a rig up for a second test on the L. Vandal farm. Same company has a rig up on the H. W. Allen farm.

Cabell County

On the waters of Charleys Creek, 2 miles east on Beckett station, Grant district, Cabell County, the Larner Gas Co. completed and shot in the shale a test on the H. C. McGraw farm. It is a light gasser. On the same stream and in the same district, 1½ miles above the last named well, the United Fuel Gas Co. completed No. 3,943 on the Joseph McCallister farm. It is a gasser good for 175,000 feet. Southeast of Beckett station, the Penn Gas Co. has a gasser good for 200,000 feet in the Berea grit on the Joseph Keaton farm.

On Bull Fork of Tanners Creek, DeKalb district, Gilmer County, the Golden Gas Co.'s test on the George Miller farm is showing for a light pumper in the Big Injun sand.

On the Big Rock Camp Creek, Sheridan district, Calhoun County, the Federal Oil & Gas Co. completed No 46 on the Roberts, Pell & Newman tract as a duster. In Sherman district, Calhoun County, M. F. Crowley completed a gasser in the Big Injun sand good for 1,000,000 feet on the J. E. Jones farm.

Gilmer County

On Trace Fork, DeKalb district, Gilmer County, the Hope Construction & Refining Co. completed a second test on the Fred S. Wilt farm, showing for a 10-bbl. pumper in the Big Injun sand. On the same stream and district, J. A. Kelly and others completed a second test on the J. A. Kelly farm. It is also a 10-bbl. pumper in the Big Injun sand. In the same district, the Hope Construction & Refining Co. completed in the Big Injun sand No. 3 on the Fred S. Wilt farm. It is a 10-bbl. pumper.

In Union district, Tyler County, the State Police Oil Co. has a Salt sand gasser at a second test on the Emma Hanes farm. In Liberty district, Marshall County, the Myers Oil & Gas Co.'s test on the G. W. Myers farm, is a gasser in the Big Injun sand.

In Clay district, Wetzel County, the Pittsburgh & West Virginia Gas Co.'s test on the John J. Ferrell farm is a 3-bbl. pumper in the Fourth sand. In New Milton district, Doddridge County, the Hope Construction & Refining Co. completed No. 1,106 on the W. H. H. Douglass farm. It is a 5-bbl. pumper in the Big Injun sand.

Drilling and Starting Tests

West Virginia has some new work starting, but the most of it is in old territory. In Courthouse district, Lewis County, Kraus & Bailey have started to drill on the Thomas Burkhamer farm. In Sardis district, Harrison County, Henthame & Lancaster have a rig up on the Ellis Maish farm. In Simpson district the Bridgeport Gas Co. is drilling on the J. W. Willis farm. In Union district, Nathan Goff has a rig up on his own farm. In Ten Mile district, Johnson & Moses are drilling at 2,800 feet on the H. P. W. Flanagan farm. The Wilson Oil & Gas Co. is due in the Gordon sand on the J. V. Curtis heirs' farm. In Paw-Paw district, Marion County, the Owens Bottle & Machine Co. is fishing at 1,700 feet on the J. E. and A. Michaels farm. The same company has started to drill a

(Continued on Page 273)

ILLINOIS AND CENTRAL OHIO AREAS MOST ACTIVE IN CENTRAL WEST

By Whit
Staff Correspondent, Central West Fields

FINDLAY, Ohio, Oct. 7.—Outside of Illinois and the Central Ohio fields but little was accomplished in the Central West, as Indiana reported only two completions and the old Lima Field of northwestern Ohio had none, although the latter has a few new wells starting in various counties. In Wood County, C. S. Glass and Shellenberger are drilling on the R. Bowman farm, Section 32, Perry Township, south of Foster, and the Just Oil Co. is drilling a wildcat on the O. W. Hoffheims farm, Section 30, Center Township, southeast of Bowling Green, and if it develops anything worthwhile, will give the operators something to work on. In Perrysburg Township, George W. Hoffman is drilling No. 5 on the Mary Reitzel farm, Section 23. Lantz and others are working at No. 3 on the Simon Achenberger farm, in Lake Township, while the Home Banking Co. is drilling No. 4, H. G. Foos farm, Section 13, Freedom Township, not far out of Pemberville.

In Bath Township, Allen County, northeast of Lima, C. A. and F. J. Peavey are drilling No. 3 S. F. Sandy farm, Section 12. B. L. Carmon and others are drilling No. 3 on the E. T. McCarey, Section 13, and Eugene Roalman is drilling on the J. Rumbaugh farm, Section 14, same township. Stallkamp and others are drilling on the Stallkamp heirs' farm, Section 12, Marion Township, Allen County.

C. W. Mertz is drilling on the M. Weiter farm, Section 21, Noble Township, Auglaize County, and the Reel Oil Co. is putting down a test on the Ben Wierwillie farm, Section 29, Washington Township, same county.

John Elias is drilling an important test or getting ready to spud on the Margaret Hiller farm, Section 3, York Township, Van Wert County. Margaret E. Grace is drilling No. 5 on the F. G. Fierovid farm, Section 21, Union Township, Mercer County.

The Waterville Gas & Oil Co. is drilling a second test for gas on the Eliza Hutchinson farm, Section 21, Waterville Township, Lucas County.

Last report from the wildcat well of the Local Oil Co., in the Catherine Walthers farm, Section 5, Liberty Township, Crawford County, is that it has reached a depth of around 750 feet and expects to test both the Clinton and Trenton formations.

INDIANA

The Siosi Oil Corp. brought in another nice well in No. 7 in the northwest corner of the William Riggs No. 2 farm, NW, Section 32, Prairie Creek Township, Vigo County, at a depth of 2,212 feet, with an initial of 60 bbls. Same company abandoned No. 4, same farm. The Ohio Oil Co. is drilling on the W. C. Piety farm, same section.

Seitz and others drilled a dry hole 100 feet from the north line and 1,120 feet from the east line of the Arthur Hunt

(Continued on Page 262)

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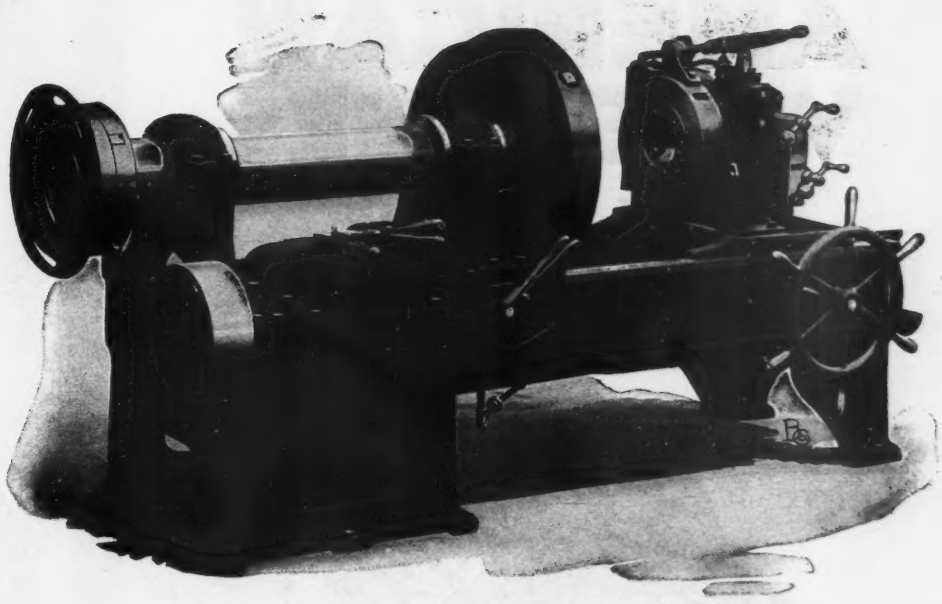

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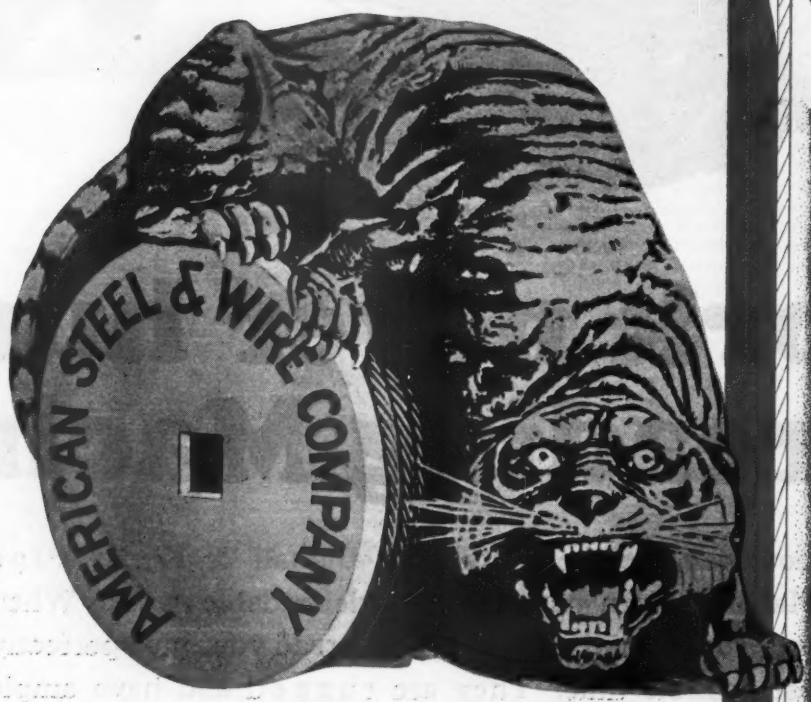

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CONTINENTAL

Three New West Texas Pools Promised

Two in Wildcat Territory in Taylor and Ector Counties and One Semi-wildcat in Ward County. Taylor-Link and Girvin Pools Forge Ahead

By L. E. Bredberg
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Oct. 7.—With the new Taylor-Link and Girvin Pools, Pecos County, forging ahead with about 50 drilling operations and 10 completed wells, West Texas again appears on the horizon in the form of an overproduction spectre, for the past 24 hours ending at 12 o'clock noon, reports three different sectors promising as many new pools, two of the discovery pools lying in absolutely wildcat territory, and the third having the semblance of a semiwildcat, but located approximately 40 miles from production.

Writing on the hypothesis that the Taylor County wildcat is the most interesting, due to the fact that the oil is sweet, and opens up a new area in a purely wildcat territory, believed to be coming from the Cook sand, it may be assumed that Taylor County will henceforth be the stage for an extensive play, in hopes of picking up the same pay formation elsewhere over the county. The southern part of Jones County will probably get some results from this discovery, also.

This new discovery is owned by J. B. Dunigan of Breckenridge, Tex., and the Shell Petroleum Corp., the latter corporation owning the majority of the acreage surrounding the well which is located on the south half of the W. R. Willis Survey consisting of 2,351.4 acres, the Davidson farm. Footage is given as 2,811 feet south and west of the northeast corner of the south half of the survey which is numbered 122.

Two Previous Tests

There have been but two tests in this area, one getting a good showing of oil and producing a small amount, but later abandoned as a noncommercial producer. This was the Mid-Continent Oil & Gas Co.'s No. 1 Taylor in the southeast corner of a 100-acre tract in Section 18, Guadalupe County School Lands, 4 miles south of this new discovery. The Mid-Continent well was drilled to a total of 3,007 feet, but plugged back and shot with 30 quarts from 2,443-60 feet, with no results, and given another shot of 60 quarts from 2,384-2,412 feet. After cleaning out it was put on pump and pumped 9 bbls. the first 24 hours, never making enough oil to pay for pumping, consequently it was abandoned as a nonproducer.

The second well in this area was drilled about 3½ miles southwest of the new discovery, in the CWL of Lot 29, Grimes County School Lands. This well was abandoned as a dry hole at 2,538 feet. Grisham & Hunter drilled this well on the D. O. Huddleston farm.

As these two tests are the only ones near the Dunigan and Shell well, it remains to be seen that there are several square miles in other directions from the well which remain untested, and which no doubt will see rigs moving in on them in the near future for other tests seeking the same pay formation, the Cook sand which obtained its name from the wells producing on the Cook ranch in Shackelford, the next county to the north and east. Roeser and Pendleton and the Continental Oil Co. own the production on that ranch and the former drilled the discovery well on the ranch.

The present nearest production to this discovery is in the Noodle Creek Pool, in the southwest corner of Jones County approximately 15 miles northwest but producing from a different pay formation, and the two areas cannot be correlated, although the pay horizon in the Mid-Continent's No. 1 Taylor to the south is believed to be the same.

One dry hole has been drilled between this new well and the Noodle Creek Pool. It is the Humble Oil & Refining Co.'s No. 1 Jacobs, about 6 miles northwest of Dunigan and Shell well, in the SE cor. of the W half of the J. A. Nabors Survey. This well was abandoned July 23, 1927, at a total depth of 2,868 feet.

Best Showing Yet

Top of the pay of the discovery was encountered at 2,387 feet, and the well is now standing only 2 feet in it at total depth of 2,389 feet. It started filling with oil immediately after striking the pay, and at present is making heads estimated at 10 bbls. of oil every 45 minutes. The operators are to underream the 6-inch, set it on bottom and make a test. There is now 80 feet of open hole to be closed before the test can be made. But the rate the hole filled with oil and the present performance of heading marks the test as practically a sure discovery.

One well about 5 miles to the northeast was drilled by the Midwest Exploration Co. in the north half of the J. F. Smith farm in the Jose Gabo Survey, about 2½ miles northwest of the town of Tye. It was abandoned as dry at a total depth of 3,280 feet.

The discovery will be closely watched for further performances, and the testing will be closely followed by every operator and company interested in this territory, but it will be a few days before the casing can be set on the bottom and the well ready for the test. It is by far the best showing yet encountered in Taylor County, and if it proves a success, will open up the county's first pool.

Ector County Wildcat

The second interesting wildcat to have a big showing is the Penn Oil Co. and Humble Oil & Refining Co.'s No. 1 Kloh-Rumsey in the center of the south line of Section 7, Block 44, Township 3s, T.&P. Survey, Ector County, approximately 3 miles NE of the three-minute producers of The Texas Company and Cosden Oil Co., Inc., in Section 13, Block B-16, Public School Lands, or about 3½ miles southeast of the station of Judkins.

This discovery topped a lime pay from 3,715-25 feet and was shut down at the latter depth to test and erect storage. The hole filled 2,000 feet with oil in 16 hours, and when the swab was run the well cleaned itself and made approximately 150 bbls. in one head, practically assuring this area of a new pool. Gravity of the oil test is 32.2. Elevation of this test is 2,925, while elevation of the No. 2 well in the Connell Pool to the west is 2,840 feet. Pay in this latter well was found from 3,495-3,515 feet, running the pay in the Penn well about 790 feet below sea level, while pay in The Texas Company-Cosden's No. 2 ran 649 feet. Top of the white lime in the new discovery is 3,410 feet. A small showing of gas was struck at 3,275 feet and a showing of oil was found from 3,585-3,600 feet. After the first pay was encountered at 3,715-18 feet there was an increase in the oil from 3,720-25 feet, with about 1,000,000 feet of gas.

As in the case of the new discovery in Taylor County, this new discovery in Ector County is also surrounded by many square miles of untested acreage, but during the past three months much acreage has changed hands in the county, especially east of this test, and as a result of this new well Ector County will no doubt come in for a big drilling play. Some of the companies purchased university lands from the State last week in Sections 1, 2 and 3 in Block 35, a strip of land owned by the university, lying between the discovery and the Connell Pool, and these companies will no doubt consider themselves exceedingly lucky at the present time. The Amerada Petroleum Corp. purchased the N half of the N half of Section 1, to the west of the well; M. H. Reed of Austin purchased the N half of the S half, and the Gulf Production Co. purchased the S half of the S half. Amerada paid $8,128, Mr. Reed paid $2,080, and Gulf paid $6,344 for the respective leases. Amerada also purchased the S half of the S half of Section 2, paying $8,128; Landreth purchased the N half of the N half of Section 2, paying $16,113; the Gulf Production Co. paid $6,248 for the N half of the S half of Section 2. Landreth paid $20,113 for the N of the N half of Section 3; the Prairie Oil & Gas Co. paid $8,200 for the N half of the S half of Section 3, and D. L. Ryan paid $4,160 for the S half of the S half of Section 3, Block 35, University Lands. The minimum rental on this acreage was 50 cents, and not less than one-eighth of the royalty, the terms running for three years.

Ownership of Acreage

The Humble Oil & Refining Co. owns the greatest amount of acreage near this well, with the Cosden Oil Co., Inc., owning the west offset section, and the Gulf Production Co. and Shell Petroleum Corp. owning north offset acreage. The Humble company also owns the east offset section, having 12 sections in all in its block around the well and to the east. The University of Texas will no doubt again be lucky, as the intervening strip between the two pools looks quite promising, many believing the top of the structure responsible for the production will be found under the university lands in Section 1, 2 and 3.

Again this well is like the Taylor County well, because it is so located that other companies are not compelled to drill because of holding offset acreage. The Humble company, holding the section to the south, across the section line, may refrain from putting down other tests at once, but may hold off for the time being.

The nearest pipe line outlet to this discovery is the Gulf Pipe Line Co.'s 10-inch from Monahans to Midland, running near Judkins, but the Humble Pipe Line Co. has two 8-inch lines running from the Winkler County Field to McCamey, and a gathering line may be laid from the nearest point on the line in Crane County to the well, a distance of about 16 or 17 miles, making the gathering system a rather inexpensive one for this company, a sister company to the Humble Oil & Refining Co.

WEST TEXAS PRODUCTION
Week ending October 7

County—	Wells	Prod.
Crane	317	38,017
Crockett	43	1,612
Ector	3	...
Fisher County	7	1,205
Glasscock-Howard	394	37,903
Jones County	73	2,710
Loving County	14	935
Mitchell County	142	2,553
Pecos County	332	137,409
Reagan County	247	17,592
Runnels County	3	17
Scurry County	5	30
Upton County	240	9,061
Ward County	13	1,754
Winkler County	601	121,174
Total this week	2,434	371,972
Total last week	2,428	367,821
Difference	6	4,151

WILDCAT OPERATIONS IN WEST TEXAS

Week Ended October 7

ANDREWS COUNTY

Company, farm and location—	Remarks—
Deep Rock's No. 1 Ogden, 2,310 ft. E, 330 ft. S, Sec. 6, Blk. A-46, Public School Land	Drlg. 1,025 ft.

BORDEN COUNTY

Louisiana Oil & Ref. Co.'s No. 1 Miller, 1,320 ft. from W and 150 ft. from S line, Sec. 355, Blk. 97, H.&T.C.	Drlg. 1,305 ft.
Moncrief et al's No. 1 Munger, C of SW, Sec. 14, Blk. 31	Drlg. 1,300 ft.
Teas & Wheeler's No. 1 Long, 1,320 ft. N and E of Sec. 27, Blk. 30, T.&P. Sur.	Top salt 1,030 ft.; drlg 2,623 ft.

BREWSTER COUNTY

E. W. Bateman et al's No. 2 Nevill, 2,000 ft. S and W line of Sec. 62, Blk. 13, G.H.&S.A.R.R. Sur.	Fishing 2,174 ft.
Brewster Oil Co.'s No. 1 fee, 2,640 ft. S and 2,598 ft. E of NW cor., Sec. 45, Blk. G-15, G.C.&S.F.	Fishing 1,935 ft.
Cowden & Bowser's No. 1-A Jackson & Harmon, Sec. 1, Blk. 331, T.C.R.R. Sur.	Set 8-in. 1,550 ft.; shut down 2,088 ft.
Forrest Oil Co.'s No. 1 Skinner, C SW SE, Sec. 100, Blk. 2, G.C.&S.F. Sur.	Drlg. 560 ft.
J. M. Hickey's No. 1 Jackson & Harmon, NE cor., Sec. 182, Blk. 9, G.H.&S.A. Sur.	Shut down 2,000 ft.
Johnson & Weekley's No. 1 Jackson & Harmon, C Sec. 104, Blk. 10, G.H.&S.A. Sur.	T.D. 3,992 ft.
Van McPhail's No. 1 McIntyre, SE cor. Sec. 59, Blk. 352, 7 mi. S of Alpine	Shut down 1,740 ft.

COKE COUNTY

Lipan Oil Co.'s No. 1 E. C. Rawlings, Sec. 390, Blk. 1-A, H.&T.C. Sur., elev. 2,750 ft.	Shut down 2,892 ft.
Mid-Kansas Oil Co.'s No. 1 W. E. Lackey, 330 ft. N and E of SW cor., Sec. 272, Blk. 1-A, H.&T.C.	Pay 3,755-56 ft.; 6⅝-in. casing set 3,451 ft.; underreaming at 4,053 ft.; drlg. 4,085 ft.; drlg. by tools.

(Continued on Page 194)

Ward Semiwildcat

The third discovery, a semiwildcat in Ward County, also came in for its share of attention and interest on October 6 when it was shut down at 2,140 feet after encountering a showing of oil with 100,000 feet of gas at 2,135 feet. The hole filled 800 feet with oil in 30 hours, and at present the company is waiting on storage before drilling it in. It is owned by the Alpine Oil Co. and is located on the Boogher farm in the SE of Section 9, Block 5, H.&T.C. Survey, 3½ miles south of the Shipley Pool, but producing from a different pay horizon than that found in that area. Elevation of the test is 2,442 feet, and the pay is found about 260 to 285 feet higher above sea level than it is in the Shipley Pool. Another reason for believing that it cannot be connected with the Shipley Pool is the fact that the Gulf Production Co.'s No. 3 Wristen in the western corner of Section 18, Block 5, in the Shipley Pool, on the southern edge, missed the Shipley pay and is drilling ahead in lime and anhydrite at 2,490 feet. This test lies between the two producing areas, and practically precludes the connection of the two areas.

As soon as sufficient storage is erected

(Continued on Page 235)

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Two New Areas in Young County

Showing in Fannin County. Gray County Operators to Continue Shut-Down. Coleman County Wildcat Ranger Feature

By L. E. Bredberg
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Oct. 7.—Two new areas, in Young County opened, a showing on the eastern edge of the Wichita Falls district in Fannin County, and agreement of operators in Gray County to continue a shutdown in the Bowers and Finley Pool, marked the important events of the Panhandle and Wichita Falls district this week. The Joines and others' wildcat, 9 miles south of Santa Anna in Coleman County, was the main feature of the Ranger district.

The Imperator Oil Co.'s No. 1 Owens, in the southeast corner of the David Crenshaw Survey, Fannin County, encountered an oil showing from 2,679-83 feet, drilled to a total depth of 2,771 feet with no increase, and plugged back to 2,656 feet. It is now standing with 800 feet of fluid in the hole after drilling out the plug at 2,656 feet. It probably will be deepened in an effort to pick up another pay horizon and in hopes of encountering an increase in oil.

This test is in absolute wildcat territory, consequently will have some effects on companies and operators interested in this area, and possibly other tests will be drilled on the strength of picking up this pay formation, and encountering a heavier showing producing oil in commercial quantities. Heretofore the county has been rather uninteresting from the standpoint of the oil industry, but it will no doubt come in for more attention after this showing, and we no doubt will hear more from tests in the county.

Young County Wildcats

Young County was the scene of two wildcat wells this week, one being exceptionally good, and extending the South Bend Pool at least 2 miles to the south, and getting one of the best wells in the county.

This well is owned by the Transcontinental Oil Co. and is located on a 1,500-acre block, making it exceptionally favorable to the owners. It is located in the northwest corner of the Ruthy Cambell Survey, Abstract 2,297, about 1,500 feet from the Stephens County line. Elevation of the well is 1,237 feet. Top of the Strawn sand was found at 4,006 feet and the well is now shut down for pipe line connection by the Prairie Pipe Line Co., at 4,010 feet. Initial production showed it making 25 bbls. per hour, with 7,500,000 feet of gas, but cavings in the hole have caused the production to decrease slightly, and it will be cleaned out and deepened. Gravity of the oil is 41.

The Transcontinental company owns acreage in all directions from the well, taking the block from Guffey and Reynolds who retained a small amount of acreage to the south and west of the well in the J. T. Mulanax Survey. One location has been made on the offsetting section to the west and one to the north in the Ficklin and Smith Survey.

Geology of the test was worked by Guffey and Reynolds on surface and subsurface, and the Transcontinental Oil Co. geologists checked it. The test missed the Ranger sand and encountered the Strawn sand, acting quite differently from the wells in the South Bend Pool which are producing different size wells from this sand, but there are some good wells in the Stovall Pool, north of the Brazos River, producing from the Strawn sand.

Another wildcat discovery, north of the river, was brought in this week by Lindsey and others on the Seddon and others' farm. This test was formerly owned by G. T. Maher, and is known as the Lindsey and others' No. 1 Seddon, approximately in the center of the north line of the Henry Garms Survey, Abstract 104. Total depth of the well is 4,168 feet and it is now pinched in for storage after flowing 100 bbls. the first hour, from a sandy lime topped at 4,165-68 feet. Several "dusters" surround this well in various direction, but it marks the opening of at least a small pool in this sector of the county, north of the river, and is now the only producer between Graham and the South Bend Pool. Offset tests will probably be located immediately, and drilling commenced to test the surrounding acreage.

Gray County in Check

Many locations are being made each week in the Wichita Falls and Panhandle districts, and drilling is going ahead at a rather feverish pace, but the most threatening area of the Panhandle, Gray County, is still being held in check, this week producing only 78,390 bbls., or 40 bbls. less than last week, a great difference from the 102,000 bbls. it was making when operators and companies met at Pampa, Tex., the first of September in order to curtail production to a point where the pipe lines and storage in the county could handle the production.

Another meeting of these same producers headed by H. M. Stalcup, vice president in charge of production for the Skelly Oil Co., resulted in further arrangements to curtail production about 20 per cent during the first part of October. Another meeting will be held at Pampa on October 13. The major companies, as a whole have not come in on the shutdown plans. However, the slump in the old wells, coupled with the shutting down of many others in the top of the pay, brought about the big decrease in daily production and is helping to hold it there, although this would be impossible if the prolific inside locatons of the fields were drilled. The shutdown plan seems to be working quite efficiently, and probably will be maintained in some form to keep the production in hand.

Ranger District

The most potent area in the Ranger district during the week was in the vicinity of the Joines and others' No. 1 Stewartson, located 150 feet from the north line, and 1,150 feet from the west line of Section 96, E.T.R.R. Survey. This well encountered the Brenecke sand at 1,455 feet and was completed at 1,457 feet, but later drilled to 1,462 feet. It has flowed several times, but at the present time has considerable cavings in it, preventing an accurate gauge from being made, but it is estimated good for from 50 to 75 bbls. per day, with 100,000 feet of gas.

It is approximately 1,100 feet east of the Taylor-Link Oil Co.'s No. 1 Stewartson which had 12 feet of Brenecke sand with a showing of oil and 3 bailers of water at a depth of 1,428-40 feet. The Joines well is a result of the showing in the Taylor-Link well. C. M. Joines of Brownwood drilled the well for a three-quarters interest in the 69½ acres in which it is located, the Taylor-Link Oil Co. making the trade with him, retaining a one-quarter interest. In addition to the three-quarters interest, Joines was given a one-half interest in several other tracts surrounding this acreage and well, which is 4 miles southeast of the Taylor-Link Pool, opened about three months ago in Section 105, E.T.R.R. Survey.

Considerable territory is opened by this test, and the Brenecke pay sand will be explored for in other holdings in the vicinity of this new discovery, possibly opening up a pool of rather fair proportions in this direction.

Shackelford and Brown

It has been reported that the Wentz Oil division has sold its producing acreage in Shackelford and Brown Counties, and is to move to San Antonio. Jake Hammon, Jr., purchased the following leases for the consideration of $100,000 cash: The Shore lease of 210 acres in the C. Betts Survey No. 625, Brown County, containing 24 wells producing 90 bbls. daily, and 60 acres in the R. J. Moberly lease in the SW S half, Section 13, Block 11, T.&P. Survey, Shackelford County, containing 5 wells making 18 bbls. daily; also the W half NW SE, Section 58, E.T.R.R. Survey, J. B. Matthews fee, containing one well with 2 bbls. production.

The Shell Petroleum Corp.'s gasoline plant in the Grosvenor Pool, Brown County, has increased its daily capacity from 3,200 gallons to 10,000 gallons daily, due to the new production in the George Pool.

Gray County Operators Meet

Representatives of independent operators and oil companies operating in Gray County, Texas, held their second meeting at Pampa, Tex., to discuss further plans for continuing the shutting down of wells in the most prolific areas in order to prevent overloading of pipe lines and storage, and preventing waste. Twenty-seven wells were affected at first, being shut down in top of the pay, and not being completed. Some of the companies which had adequate pipe line facilities out of the areas did not come in on the shut down, but the majority of the operators and companies with production co-operated and helped bring the daily average production down from around 102,000 bbls. daily, its peak, to 78,000 bbls., showing that the shut down had an enormous influence and really succeeded in gaining the desired objective. Another meeting will be held October 30 to again discuss future needs and plans.

WILDCAT OPERATIONS IN TEXAS PANHANDLE

Week Ending October 7

CARSON COUNTY

Company, well, farm, name, section and block—	Remarks—
Continental Oil Co.'s No. 1 Block, 330 ft. S and W, NE cor. SE Sec. 111, Blk. 4, I.&G.N.R.R. Sur.	Drlg. 2,165 ft.
Danciger O. & R. Co.'s No. 1 Block, 330 ft. from N and E lines, Sec. 112, Blk. 4, I.&G.N. Sur.	Drlg. 2,550 ft.
Delmar Oil Co.'s No. 5 Noel, 330 ft. S and W, NE cor. W½ SE, Sec. 198, Blk. 3, I.&G.N. Sur.	S.G. 3,000-10 ft.; S.D. 3,131 ft.
Empire G. & F. Co.'s No. 1 Fields, 1,650 ft. from N and E, Sec. 13, Blk. 7, I.&G.N. Sur.	Rigging up.
Empire G. & F. Co.'s No. 1 M. P. Co., "C," 330 ft. N and W, SE cor. NW, Sec. 108, Blk. 4, I.&G.N.R.R. Sur.	Testing 3,305 ft.
Empire G. & F. Co.'s No. 2 Deahl, 660 ft. N and E, SW, Sec. 3, Blk. 5, B.&B. Sur.	Location.
Empire G. & F. Co.'s No. 1 Fuqua, 330 ft. N and W, SE cor. NW, Sec. 17, Blk. 3, A.B.&M. Sur.	T.D. 2,760 ft.; 23,500,000 ft. gas from 2,370-2,633 ft.
Empire G. & F. Co.'s No. 2 M. P. Co. (Lane), C NE, Sec. 62 Blk. 4, I.&G.N.R.R. Sur.	Drlg. 2,555 ft.; 39,000,000 ft. gas.
Gulf Prod. Co.'s No. 3 Cooper, 330 ft. S, 990 ft. W, NE cor. SW, Sec. 5, Blk. 9, I.&G.N.R.R. Sur.	Drlg. 3,130 ft.; 1,500 ft. oil in hole; T.P. 3,040 ft.
Gulf Prod. Co.'s No. 4 Cooper, 330 ft. S and E, NW SW, Sec. 5, Blk. 9, I.&G.N.R.R. Sur.	Drlg. 2,900 ft.
Herragan Oil Co.'s No. 1 L. C. McConnell, 330 ft. N and W lines W½ SW, Sec. 187, Blk. 3, I.&G.N. Sur.	S.G. 2,780 ft; increase from 2,860-2,908 ft; S.D. 2,925 ft.
Midwest Explin. Co.'s No. 4 Cooper, 330 ft. N and E, SW cor. W½ NW, Sec. 5, Blk. 9, I.&G.N. Sur.	Drlg. 3,015 ft.
Phillips Pet. Co.'s No. 1 Garner, 330 ft. N and E, SW cor. SW, Sec. 114, Blk. 4, I.&G.N. Sur.	Drlg. 2,375 ft.
Prairie O. & G. Co.'s No. 2 Nall, 330 ft. from N and W lines N½ E½ SE, Sec. 198, Blk. 3, I.&G.N. Sur.	Drlg. 3,030 ft.; 10,000,000 ft. gas from 2,830-2,985 ft.
Red River Gas Co.'s No. 3 Lee Bivins-A, C SE SE, Sec. 43, Blk. M-20, G.&M.R.R. Sur.	S.D. 550 ft.
Reynolds et als' No. 2 Cooper, 330 ft. from S and W lines, E½ NW, Sec. 5, Blk. 9, I.&G.N. Sur.	Drlg. 1,700 ft.
Ryan Cons. Oil Co.'s No. 5 Block, 330 ft. N and W, SE cor. NE, Sec. 111, Blk. 4, I.&G.N. Sur.	Drlg. 2,140 ft.
Ryan Cons. Oil Co.'s No. 6 Block, 330 ft. S, 990 ft. E, NW NE, Sec. 111, Blk. 4, I.&G.N. Sur.	Drlg. 600 ft.
Shell Pet. Corp.'s No. 1 Percival, 330 ft. from N and E, SE, Sec. 199, Blk. 3, I.&G.N. Sur.	Rig.
Skelly Oil Co.'s No. 18 Schafer, 990 ft. S, 355 ft. W, NE, Sec. 68, Blk. 4, I.&G.N. Sur.	8,000,000 ft. gas 2,710-40 ft; 10,000,000 ft. gas 2,835-56 ft; drlg. 3,092 ft, T.P. 3,005-20 ft.; swabbing 58 bbls. first 12 hrs.
Skelly Oil Co.'s No. 19 Schafer, 330 ft. N, 990 ft. E, SW cor. NE, Sec. 198, Blk. 3, I.&G.N. Sur.	6,000,000 ft. gas 2,895-2,970 ft; S. D. 3,100 ft.
Skelly Oil Co.'s No. 20 Schafer, 330 ft. N, 990 ft. W, SE cor. N½, Sec. 198, Blk. 3, I.&G.N. Sur.	S.D. 3,090 ft.

(Continued on Page 193)

NORTH TEXAS PRODUCTION
Week Ending October 5

Panhandle district—	Bbls.
Carson County	9,867
Hutchinson County	26,835
Gray County	78,390
Moore County	951
Potter County	0
Wheeler County	717
Total this week	116,760
Total last week	115,748
Increase	1,012
Wichita district—	
Archer County	18,761
Baylor County	68
Clay County	733
Cooke County	10,807
Foard County	230
Jack County	4,018
Haskell County	75
Montague County	6,420
Throckmorton County	646
Wilbarger County	31,122
Young County	6,474
Wichita County	25,662
Total this week	105,016
Total last week	105,751
Decrease	735
Ranger district—	
Brown County	9,136
Callahan County	3,460
Coleman County	7,750
Comanche County	1,200
Palo Pinto County	530
Eastland County	5,751
Shackelford County	10,025
Stephens County	5,830
Total this week	43,692
Total last week	45,093
Decrease	1,401
Total this week	265,468
Total last week	266,592
Decrease	1,124

Executives Pledge Aid to Engineers

J. Edgar Pew Urges Co-operation on Straight Hole, Air-Gas Lift and Unit Control Studies

By J. Edgar Pew
Sun Oil Company*

It is very appropriate, in my opinion, that the Mid-Continent district of the A.P.I. Division of Development and Production Engineering hold its fall meeting during the International Petroleum Exposition and Congress in Tulsa. You are gathered here to discuss problems of vital and current interest and the Exposition is providing the means for exhibiting mechanical developments that have taken place. You are both performing a constructive service to the oil industry.

I have had the privilege of participating in the oil business for a considerable period of time and of witnessing at close range the marked progress that has been made in drilling and production methods and equipment, and I want to state at the outset that no finer contribution is being made to this development than the work you gentlemen are performing here. The industry has long since graduated from the primer and grammar school grades. We are now in the midst of our greatest technical and practical development. The equipment and methods of yesterday are no longer sufficient for our needs. We are in an age of greater accuracy, not only in equipment but in methods; guesses are no longer sufficient. We are also doing things on a larger scale than ever before. It is necessary that we have intelligent, collective and co-operative thought on our many problems. We must exchange opinions and ideas with the other fellow.

Standardization Results

Take the question of standardization of oil field equipment sponsored by the Institute. These specifications are the result of collective effort. They could not have been formulated in any other way. No one will seriously contradict the beneficial results that have already accrued to the oil industry because of this standardization work, or the vastly greater results that will accrue as our standardization program becomes 100 per cent effective. It is a serious question in my mind if we could have made the progress we have made in recent years, especially in deep drilling, but for the improved and standardized equipment we are receiving today. The time is not far distant when to be without standard threads and connections will be unthinkable. Standardization has taken the "guess" out of equipment and has cleared out the underbrush of the hundreds of odd sizes of threads, taper joints, etc., leaving us free to tackle the new and hitherto unthought-of problems which now confront us.

The same will be true in the work of the Division of Development and Production Engineering that is meeting here today. You have outlined a constructive and far reaching program. I am aware of the progress you are making on the question of straight hole drilling practice and on air and gas injection for maintaining pressure and repressuring, both of which are of particular interest at this time. Already the results are commencing to be shown. This division of the Institute, by its efforts, has focused the attention of the entire industry on the problem of straight hole drilling to such an extent that definite limitations are now being placed by some of the oil companies on the amount of deviation that will be permitted from vertical, showing conclusively that practices heretofore considered difficult to combat are amenable to treatment if we but devote our time and attention to their solution.

However, these are not one-man problems. They require collective thinking and action. No one company or individual has the necessary trained personnel or experiments to solve them. It is only by co-operative action that we can establish these higher levels of comfort and efficiency.

As an industry grows, new problems are continually being presented and the executive of today welcomes all the assistance he can get, particularly on matters of equipment and practices that can be procured from meetings of this kind. The reason is simple. He knows if a subject is thoroughly ventilated and discussed that the solution, when found, is usually a sound one, as it must stand the fire of public opinion, criticism and actual use. He is procuring the benefit of outside opinions that often are not available in his own organization and, what is more important, is informing whether these recommendations are based on actual experienced or mere theory.

To quote an aphorism, "You can't get any more out of this world than you put into it." To get the greatest good from these meetings we must all participate and give of what we have. If this is done, we should soon explore all the various blind alleys on the subjects under discussion and finally guide ourselves along a path of action that is sound and economical.

It is possible that some of you may have had the thought: "I wonder if this sort of thing gets me anywhere—I may as well get by with as little effort as possible." This, of course, is a mistaken idea for anyone to have. First of all, he fools himself because by following such a precept he is limiting his own education and usefulness and thereby shutting himself out of possible advancement. Second, the executive branch of the industry usually knows pretty well what is going on, and if work of this character was not accomplishing real results, it would soon withdraw its support. The modern executive of today realizes more than ever before, the extent to which he must rely on work of this kind, for the simple reason that he cannot get the answer any other way.

Chapter Discussions

I recently read a report of a meeting held by one of your chapters where the question of standardization was discussed at some length. The discussion brought out the fact that some of those present were not thoroughly familiar with the American Petroleum Institute standards and that some of the questions asked might easily have been answered by referring to the proper specifications. Chapter discussions can do much to clarify this situation. I know of no better way by which the men in the field can help themselves than by attending and becoming active in these chapter discussions. It is again the old story, "That you have to give something to get something."

One of the principal contributing factors to the organization of this division of the American Petroleum Institute was the meeting of executives and engineers held at Ponca City, Okla., in 1927, to discuss the question of gas conservation and its relation to the production of oil. Much good has come from that meeting. Among other things, it created the desire and wish among the field producing executives and engineers for a permanent organization of some kind where information and data could be submitted, exchanged and commented on for the general good of all. This division is the result. The report of that meeting in Ponca City has also since been published in book form by the Institute, called: "The Function of Gas in the Production of Oil," and has proved to be a valuable reference book on the subject of gas. But we are moving along fast. New developments are upon us and if I were to make any concrete suggestions to the members of this division, it would be to urge you to continue these studies on gas conservation, to study carefully the results of experiments that are now being conducted through unit operations or otherwise, and again discuss the results.

Unit Operation

The Ponca City report referred to was based largely on theory and on engineering belief, as it was admitted that up to that time, there had been little if any opportunity to test these theories by actual practice. We now have a different situation. Block ownership with a unit operation is rapidly becoming a practice in the oil industry, and it is on such operations that better practices in operations can and will be had, and from this situation, your opportunities as engineers will come. You should use these opportunities with your executives to prove and develop your theories which will, I believe, when done, result in great benefits to your companies and to the entire oil industry.

Just a word further in reference to crooked holes. The development of the extent to which crooked holes may be crooked in drilling, is one of the greatest surprise to the oil industry.

The crooked hole is probably the cause of most of our twistoffs, and resulting fishing jobs. We are in the habit of blaming these on our drilling equipment. In addition to this, we have all built up vast subsurface geological data from the records of wells drilled within given areas. All of this data is based on the supposition that holes drilled were straight or vertical in their courses. If they were not vertical the question then arises, "How far off the vertical were they?" And also, "What of the other well or wells used in the same correlation?"

As long as we do not know these facts, not only as to one of these wells, but as to all of them, in my judgment this subsurface data we have collected is worthless.

I have here a model of a well which I believe to be accurately measured and oriented as to its entire course. This was done with a gyroscope and a camera. The bottom of the hole is more than 1,000 feet distant from a point vertically beneath the top. The course is traced. I will also show the actual pictures taken of this hole.

This Division of Development and Production Engneering should play a very interesting role in future oil developments. The measure of your accomplishments will be in direct proportion to the time and effort expended. You have a great opportunity to serve your interests, those of your employer, and those of the entire oil industry. As long as your energies are directed along the line of your present activities, you can depend upon the active support of the executive branch of the industry.

*Before Mid-Continent district of A.P.I Division of Development and Production Engineering, Tulsa, October 7, 1929.

BIG WELLS IN PECOS, TEX., SWELL SEPTEMBER'S INITIAL PRODUCTION

Sixteen oil wells completed in September in the Pecos County Field, in West Texas, with a total rated initial production of 250,859 bbls. were responsible for a tremendous increase in the initial production of wells completed in the fields east of California last month.

A total of 2,244 wells completed in all fields, with a total rated initial production of 501,542 bbls., 652 dry holes and 240 gas wells comprised the record of the month, which was a decrease of 334 in completed wells; an increase of 150,301 bbls. in initial production; 63 fewer dry holes and 16 fewer gas wells, compared with August. The big Pecos gushers were not permitted to flow any longer than it took to get potential gauge on them but they give additional evidence—if such was needed—of the large potential production of that great oil area.

There was little change in the number of rigs and wells drilling but inasmuch as there was a drop of 334 wells completed and a decline of 8 in the number of operations at the close of the month, it is indicated that there was a net falling off of 342 operations in the course of the month as compared with August.

SUMMARY OF ALL FIELDS

Wells Completed

Field—	Comp.	Prod.	Dry	Gas
Eastern	603	3,200	49	55
Central Ohio	139	829	39	60
Lima	23	221	3	3
Indiana	9	100	4	2
Michigan	47	5,881	15	3
Illinois	77	2,810	10	0
Kentucky	146	8,791	48	5
Mississippi	1	....	1	0
Oklahoma	274	77,934	95	20
Kansas	87	13,690	45	2
Texas Panhandle	55	16,405	7	16
No. Central Texas	293	29,502	140	9
East Central Texas	6	....	5	1
West Texas	78	274,436	32	3
Southwest Texas	100	15,212	51	9
East Texas	6		0	6
Gulf Coast	101	36,738	35	4
North Louisiana	60	6,610	18	25
Arkansas	29	934	12	1
Wyoming	24	3,821	9	4
Montana	51	1,268	11	10
Colorado	11	....	9	2
New Mexico	22	3,110	12	0
Utah	2	....	2	0
Total Sept.	2,244	501,542	652	240
Total Aug.	2,578	351,241	715	256
Difference	334	150,301	63	16

Rigs and Wells Drilling

	Rigs	Drlg.	Ttl.
Eastern	123	485	608
Central Ohio	79	186	265
Lima	5	31	36
Indiana	4	51	55
Michigan	61	140	201
Illinois	3	50	53
Kentucky	10	176	186
Tennessee	3	12	15
Mississippi	3	14	17
Alabama	0	5	5
Oklahoma	171	792	963
Kansas	63	288	351
Texas Panhandle	31	162	193
No. Central Texas	88	417	505
East Central Texas	2	34	36
West Texas	72	268	340
Southwest Texas	40	169	209
East Texas	6	17	23
Gulf Coast	49	233	282
North Louisiana	55	112	167
Arkansas	14	58	72
Wyoming	26	156	182
Montana	16	113	129
Colorado	16	76	92
New Mexico	21	71	92
Utah	2	29	31
Total Sept.	963	4,145	5,108
Total Aug.	920	4,180	5,100
Difference	43	35	8

T. L. POMEROY DIES

Theodore L. Pomeroy died suddenly in his home in Maple Avenue, Greenwich, Conn., of a heart attack. He was 61. Mr. Pomeroy formerly was president of the Indian Refining Co.

Pipe Line Construction News

EASIER FINISHED STEEL PRICES ARE REPORTED

By B. E. V. Luty

PITTSBURGH, Pa., October 7.—The volume of steel buying as a whole has decreased farther, and the rate of production has decreased on account of recent decreases in buying. Unless there is some radical change, from influences not now to be guessed, steel activity will continue slipping to the end of the year. Unless conditions have become very unfavorable there is always an improvement after January 1.

From early in the year until late in June steel production was almost at capacity, being sometimes a little above rated capacity in the case of open hearth, and at close to capacity in Bessemer. In July and August there were only slight decreases while in September the downward trend was marked and that trend is continuing this month. By the middle of September it was apparent that there would not be the usual autumn revival.

For 18 months through last month steel production while varying from month to month was always above that of one year previous. Now that record is ended, mill operations being below those of last October. Last year production had been increasing, October being the high month of the second half, while this year operations have been decreasing.

Steel production has not been in usual relation to general trade activity, having been above its relation since about the middle of last year. Now it is getting down to its usual relation and if general activity decreases as seems likely, steel production may by December be somewhat below its average rate. At present it is still above its average of the last four years.

Production of steel ingots is now at between 80 and 85 per cent of capacity.

First there was the usual seasonal decrease in automobile production and then a further decrease, the industry being now in more or less comatose condition. Even Ford has curtailed production in the past month, having caught up with orders, and appearances are that new body models will be brought out shortly, to be followed by chassis changes involving a switch to six cylinders. The steel trade does not expect much business from the automobile industry until late in the year, for first quarter delivery. As nearly one-fourth of the steel made in the first half of this year went to the automobile industry this alone makes a big change.

Then there has been a large seasonal decrease in rail production and while the new buying movement has started that will not involve much production before December. The agricultural implement industry is running rather light and prospects of farmer buying power are rather poor. Freight car shops are nearly through with their recent large orders. Some additional orders are now being placed but it will be some time before they are in production.

Easier finished steel prices are seen in some quarters. Black sheets are easier and efforts to put galvanized sheets on a firm basis of 3.60 cents have been abandoned. Nails have been declining for three months and are off fully 20 cents a keg. Bars, shapes and plates are all easier, and there is some question about strip prices.

Standard pipe prices are reported firm in nearly all sections. This is not so much a matter of demand as it is of jobbers avoiding improper competition. Some jobbers have been notified that accounts will be withdrawn if they do not adhere to prices.

Pipe mills are averaging about a 65 per cent operation. They did better in September than in August, on account of various individually small orders for line pipe.

CONTRACTS ANNOUNCED FOR TAYLOR-LINK LINE

FORT WORTH, Tex., Oct. 7.—The Landreth Production Co. has announced the contracts for immediate construction of an 8-inch screw line, 15 miles long, from the Taylor-Link Pool, Pecos County, to its 40-car loading rack and tank farm at McCamey, Tex. The loading rack was purchased from the Continental Oil Co., and ten 80,000-bbl. tanks are to be built just north and west of McCamey, while four eighties are going up in the NW Section 18, Block 20, Pecos County, north of the Taylor-Link Pool. The line will be run 2 miles from the Rowan and Tong Pool, and will also gather oil from that pool. The National Supply Co. is to construct the line, while the Kirk Morrow Tank Co., formerly the Union Iron Works, is building the storage.

This will be the second line for the Taylor-Link Pool, the Humble Pipe Line Co. already having a 6-inch line from its tank farm at McCamey to the pool. The Texas Pipe Line Co. is to build a 6-inch line from its tank farm at McCamey to the Rowan and Tong Pool and connect to the discovery well in that area.

These two pools are exceedingly active in drilling, and unless the two new areas are put on proration they will need considerable outlet, if they prove prolific.

SAN LUIS OBISPO LINE

LOS ANGELES, Calif., Oct. 5.—With increased production at Kettleman Hills which is taxing capacity of General Petroleum Corp.'s pipe line under contract to Standard Oil Co. of California, the latter company is rushing work on its 8-inch line to San Luis Obispo. The tidewater line is expected to be completed within 20 days, according to men in charge of construction work. A submarine section will be laid to Morrow Bay to make tanker loading possible

The new line will have capacity of transporting 50,000 bbls. of oil daily. More lines also are to be laid, including a gasoline line about 9 miles in length, extending along Kettleman Hills from the Standard camp. Plans are also under consideration by Standard for a line connecting the north and south dome.

FORTY-MILE LINE IN MEXICO

Details are to hand concerning the report that the Cia. Mexican de Petroleo El Aguila will construct a pipe line from Manchital to the refinery at Minatitlan to collect the output of the wells at Teapan Nuevo, Agua Dulce and other camps along the route. The distance is approximately 40 miles. This area is in the extreme southern part of Vera Cruz. The company has had a refinery at Minatitlan for many years and has recently doubled its capacity. The company is having the river channel dredged to a depth of 30 feet from the mouth of the river at Puerto Mexico to the refinery, to enable oceangoing vessels to load at the refinery.

SHELL OKLAHOMA CITY LINE

The Shell Petroleum Corp will lay a 6-inch line from its Meeker station to the Oklahoma City Pool. This line will connect with the company's main line running north and south which is an 8 and 10-inch trunk line. Survey has been made and construction work will start immediately.

COMPRESSOR PLANT ON KETTLEMAN LINE

LOS ANGELES, Calif., Oct. 5.—The Pacific Gas & Electric Co. gas compressor plant located 2 miles north of the Milham discovery well, is expected to be put in operation about November 1, according to Fred F. Doyle of San Francisco, company representative and one of the designers of the plant.

The plant consists of five 760 horsepower Cooper-Bessemer compressors and will be gas engine driven. It will be the largest and most modern plant of its kind in the State, being installed and constructed at an expense of more than $500,000 as one of the units of the Kettleman Hills-San Francisco gas pipe line which is to supply northern and central California with natural gas.

The company is establishing a permanent camp at the site of the compressor, with offices, dwellings, bunk houses, commisary and warehouses, with a population of from 30 to 50 persons.

The company will generate its own electricity to supply the needs and make other permanent improvements. The present force has leveled off a landing field for airplanes and officials of the company have been making the trip to Coalinga from San Francisco by Continental Air Express and hopping from there to the company camp by private plane.

WEST KENTUCKY EXTENSIONS

It looks very much as though Muhlenberg County would be the next big field to be developed in the western portion of Kentucky, and if wells come in as they have recently, it will require the laying of a pipe line from the field to the trunk line running from Allen County, Kentucky, to Lawrenceville, Ill. At the present time the oil produced in the Greenville area of the county is being loaded on tank cars and shipped to refineries at Louisville, but a few more big wells will bring the production to a point where it will be almost impossible to ship the crude by tank cars.

With the good oil wells coming in in the Barnett's Creek Church Pool, of Ohio County, it has become necessary for the Illinois Pipe Line Co., which serves the operators, to construct an additional 4-inch pipe line. The 3-inch line which has been taking care of that part of the field for some time is overloaded and the wells coming in fast, the pipe line company states another line will be laid to its pump station at Taffet, a few miles away. The pumping of the two wells brought in by Hupp and Duff on the Mason-Bartlett farm, in the Church Pool, as far as the tank capacity would permit, filled a 100-bbl. tank every 45 minutes, to say nothing of what the wells brought in by the Rex-Pyramid Oil Co. on the Sallie Hoover farm, adjoining the Mason-Bartlett farm. Hupp and Duff were compelled to shut in their No. 7 on the Mason-Bartlett at the top of the sand.

GLENDIVE-WILLISTON LINE

The Montana-Dakota Power Co. has taken over the electric plant of the city of Williston, N. Dak., and will operate this plant as a part of the company's operations. Surveyors are now checking a survey for a pipe line and the laying is expected to start as soon as the right of way has been determined. The company paid $125,000 for the city-owned electric plant at Williston and the franchise to serve that city with natural gas. The new gas line will be laid from the Glendive Field in eastern Montana to Williston.

COLORADO INTERSTATE EXTENSIONS REPORTED

DENVER, Colo., Oct. 5.—The Colorado-Wyoming Gas Co. (Cities Service Co.) has turned the gas into the distributing mains of the Public Service Co. of Colorado in Boulder and the town now has natural gas for the second time in its history. It formerly had a supply of gas from a well in the Boulder Field which played out a few years ago. The new supply comes through the Colorado-Interstate Gas Co.'s line from Amarillo, Tex., to Denver. The line is to be extended on north to Fort Collins where it will tie in with the system to Cheyenne, Wyo. There are a few oil wells in the Boulder Field making 10 to 25 bbls. a day. Heretofore the oil has been sold to the local utility for fuel purposes.

The Colorado Interstate Gas Co. is making additional extensions of its line through the Arkansas Valley in southeastern Colorado and it is expected that the towns of Lyons and Las Animas will be supplied about October 20. The town of Greeley, in northern Colorado, is to have natural gas from the Berthoud Dome, in Larimer County, as a result of the signing of a contract between the Greeley Gas & Fuel Co. and the Standard Oil Co. of Colorado.

IROQUOIS LAYING LINES

OIL CITY, Pa., Oct. 5.—In order to insure its future supply of natural gas the Iroquois Gas Corp. has acquired large tracts of undeveloped territory in Cattaraugus, Wyoming, and Allegany Counties, so it has nearly 500,000 acres of land under lease for oil and gas.

The company is now engaged in constructing pipe lines through that territory in order to serve the communities which are located within its bounds, with natural gas, and to have pipe lines available to transport gas when it is produced in the drilling campaign which is now being planned for that district. This work involves the laying of over 75 miles of high pressure transmission lines and about 65 miles of low pressure distribution lines. Plans call for the completion of at least 85 per cent of this work by the end of this year.

Among the towns which will receive gas for the first time are Ellicottville, Franklinville, Delevan, Arcade, Castile, Silver Springs and Nunda. Contract has just been made for the sale of natural gas to the New York Central Gas & Electric Corp. for distribution in Dansville and Wayland, Livingston County.

CONRAD LINE COMPLETED

CASPER, Wyo., Oct. 5.—Pondera Utilities Co. has completed its gas line from the Kevin-Sunburst Field to the town of Conrad in northern Montana at a cost, according to the management, of approximately $8,000 a mile. A celebration was held in Conrad and an elaborate program, consisting of a parade, special theater performances and a dance. A spectacular feature was the lighting of two gigantic gas torches.

BOZEMAN FRANCHISE

The city of Bozeman, Mont., voted to give the Citizens Gas Co. of Shelby, Mont., the franchise to furnish natural gas to the citizens of Bozeman. The Citizens Gas Co. proposes to lay a pipe line from northern Wyoming to Bozeman which would mean a line about 150 miles in length. Bozeman has a population of about 6,000 and the gas company promises to have the gas turned into the city by October, 1930.

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CALIFORNIA INDEPENDENTS REJECT CONSERVATION PLAN

LOS ANGELES, Calif., Oct. 5.—After a day of acrimonious debate, independent producers of Los Angeles Basin fields almost unanimously refused to sign the gas conservation agreement submitted by seven major operators in its present state and appointed a committee of members to consult with the original sponsors for the purpose of eliminating objectionable features which, according to the general consensus of opinion among independent producers, precludes an equitable distribution of natural gas.

This meeting of independent operators, called by E.D.Reiter, was the outgrowth of a hearing held last week by Reed Bush, state oil and gas supervisor, in the conference room of the California Railroad Commission, at which time a number of smaller operators requested more time in order that they might attempt to effect some kind of an agreement among themselves with respect to the gas conservation law and the supplementary agreement sponsored by major companies which contemplates the regulation of production and distribution of natural gas in the Santa Fe Springs, Long Beach, Ventura Avenue and Seal Beach Fields. Before adjournment, independent operators organized under the name of the Independent Oil Operators and elected E. D. Reiter, president, Herbert Macmillan, George Machris and Henry Woolner, vice presidents. and Thomas Lipps, secretary.

After Herbert Macmillan moved the adoption of the proposed agreement submitted by major companies, Walter Haas, formerly city attorney of Los Angeles, and at present counsel for the Bellview Oil Co., condemned the gas conservation law and the proposed association sponsored by a number of larger operators for the purpose of facilitating distribution of natural gas to public utilities. Haas again served notice that his client will use every means at its command to invalidate the gas conservation law when the hearing on injunction proceedings opens in Los Angeles October 14, on the ground that the legislation in question is unconstitutional and void because it confiscates private property without adequate compensation. Frederick Kincaid, representing the South Basin Oil Co., Lloyd Corp., Dabney & Johnston Oil Co. and the Herndon Petroleum, expressed his opinion that the new gas law is unjust and illegal.

George Machris, president of the Wilshire Oil Co., was also rather frank in his expressions concerning the movement to regulate production of natural gas, and said in his opinion the primary object of major companies is to reduce the production of crude oil and not to cut the output of natural gas, as the new bill ostensibly proposes to do. Mr. Machris also told the operators present that it is the State's intention to cut crude production in the Santa Fe Springs Field 48½ per cent, Long Beach 32 per cent, Seal Beach 33 per cent and Ventura Avenue 27 per cent. The principal objection to this plan is that if daily production at Santa Fe Springs is reduced to 222,000 bbls. and prevented from exceeding that figure it would force operators to keep on cutting back present production every time one of the 200 drilling wells was completed. Machris also ventured the opinion that under existing conditions, whereby the major companies already have contracts covering sale of natural gas to public utilities, independent operators would be prevented from discovering any new fields for the simple reason that they would be prevented from disposing of their gas. He also stated that the Wilshire Oil Co. has offered 40,000,000 feet of natural gas daily to gas distributing companies without cost and that the companies refused to take it for nothing.

Several operators suggested that an attempt be made to have the state railroad commission force gas companies to purchase their natural gas requirements for commercial consumption ratably from each producer. It was apparently unknown to those advancing this method that this was suggested long before the origin of the present conservation plan but it went for naught when one company having a valid contract covering sales of natural gas flatly refused to waive any deviation from contractual obligations on the part of gas purchasers. The committee appointed to negotiate a revision of the agreement sponsored by major operators has already held a preliminary meeting and will probably submit its findings to a general assemblage some time during the next few days.

FUNDAMENTAL FACTORS IN RECOVERY FROM SANDS

The American Petroleum Institute's research division reports on the progress to June 30 on Project 37, Fundamental Factors in the Removal of Petroleum from the Sands, as follows:

Apparatus has been designed and constructed for the measurement of the rate of absorption of natural gas and its constituents in various hydrocarbons and crude oils. Preliminary runs on the apparatus using kerosene and methane have given highly satisfactory results. Several runs made with pure hydrocarbons indicate that valuable evidence on the rate of absorption of gaseous hydrocarbons in crude oils will be obtained.

Pure hydrocarbons are being prepared by means of repeated fractional distillations and a thorough refining process.

As an extension to the work under the project, measurements will be made upon the effect of dissolved gas upon the viscosity of liquid hydrocarbons. For this purpose, a pressure viscosimeter is being constructed.

SHE IS JUST WILD ABOUT THE OIL SHOW

(Continued from Page 57)

Technical Building, where I wanted to look at geological specimens of what they call the Ordovician period. I think that anybody studying the oil business ought to know something about the Ordovician period. Delbert said he would be back in half an hour, but he didn't come. I had learned all I needed to know about the Ordovician period, so I just found my way to the main office of the exposition and asked for Mr. Way. I wanted to be able to say I had met him anyway.

Meets Mr. Way

A girl at the counter said Mr. Way was very busy, but just at that moment he happened to pass and the girl said, "Mr. Way, this lady would like to see you."

Mr. Way was just as gracious and polite as could be and when I told him who I was he said he knew Delbert very well. I explained how I had happened to come to the office and he said, "It's too bad you have so little time right now, for it would be a pleasure to take you around to some of the major points of interest."

I thought to myself, "Well, if Delbert loses time looking around for me over in the Scientific and Technical Building, its his own fault." I said out loud: "Oh, that would be magnificent, Mr. Way, and I can take the time all right." He looked sort of perturbed. I guess he was afraid Delbert might not like it. He went over to another man—one of his assistants I think—and said something about "trying to drill by her and mud her off." Just some directions, I suppose, regarding work he wanted done during his absence. Mr. Way took me right over to the Scientific and Technical Building. I explained that I'd been there, but he said he was sure I hadn't seen some of the most interesting things. Well, of course, we ran right into Delbert.

"Hello, Del," Mr. Way said, and Delbert answered, "Hello, Bill," and the two began talking about what a successful show it was. Suddenly Mr. Way said, "Oh, say, this is too bad. There's Mr. Skelly, president of the exposition, down at the other end of the building, and I've just got to see him. If I don't snatch this chance I may not get another. You'll excuse me under the circumstances, won't you?"

Bill Was Just Heartbroken

Well of course I could see just how it was. I was terribly disappointed, but Mr. Way was so polite and sorry that of course I told him it was all right and not to mind. He hurried away to catch Mr. Skelly. I noticed Delbert was looking kind of flustered and I asked, "What's the trouble?"

"Not a thing," he said, "Only Bill Way's going to have a hard time catching Mr. Skelly."

"Why?" I asked.

"Because I happen to know that Mr. Skelly is down at the Mayo Hotel at this moment."

"Then it couldn't have been Mr. Skelly that Mr. Way saw," I said. "It must have been somebody that looked like Mr. Skelly. I've a mind to see if Mr. Way doesn't want to resume our sightseeing trip now that he knows he was mistaken."

"No," Delbert said, rather roughly I thought. "Come on."

I pretend I don't notice little exhibitions of irritability like that, for I know a man isn't accountable for all he does when he's as tired out as Delbert. And besides I want him to have nothing but pleasant recollections of my part in this trip, for I mean to come back next year.

WELL KNOWN OIL MEN ORGANIZE NEW EQUIPMENT DISTRIBUTING COMPANY

E. I. Hanlon

M. F. Waters

D. E. Buchanan

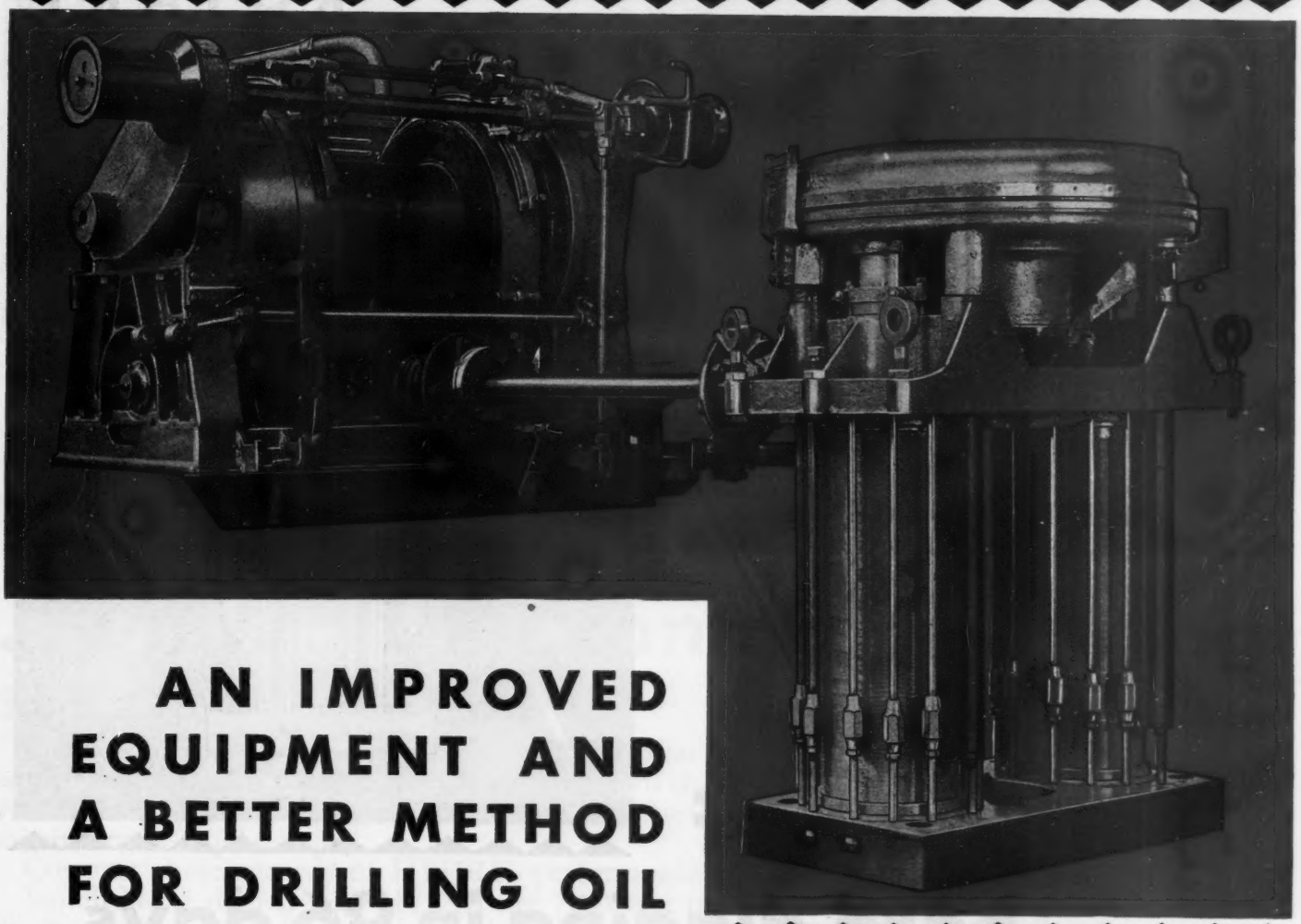
J. H. Boyle

Beginning November 1 the newly organized Hanlon-Waters, Inc., will take over the oil field distribution of the products manufactured by Fisher Governor Co., Victaulic Co. of America and the Reed Air Filter Co.

Officers of the new company are: E. I. Hanlon, chairman of the board; M. F. Waters, president; D. E. Buchanan, vice president, and J. H. Boyle, secretary and treasurer. All are widely known for their long and active connection with the petroleum industry.

General offices and warehouse have been established at First and Detroit Streets, Tulsa, in the three-story building formerly occupied by the International Supply Co. Adequate stocks of supplies and specialties will be carried at all times and additional lines are to be added later, it is stated. A new oil and gas separator employing a new principle; a departure from the conventional type of separator, will also be introduced within a short time by Hanlon-Waters, Inc.

HYDRIL



AN IMPROVED EQUIPMENT AND A BETTER METHOD FOR DRILLING OIL WELLS

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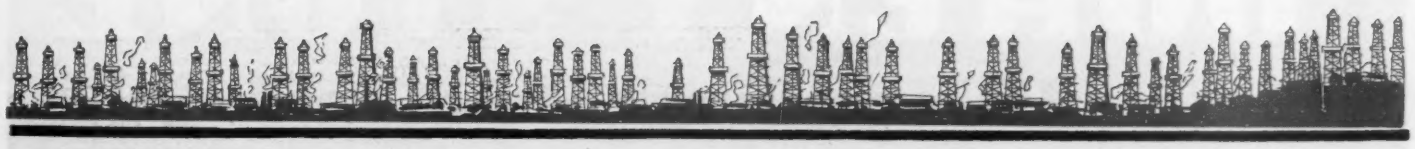
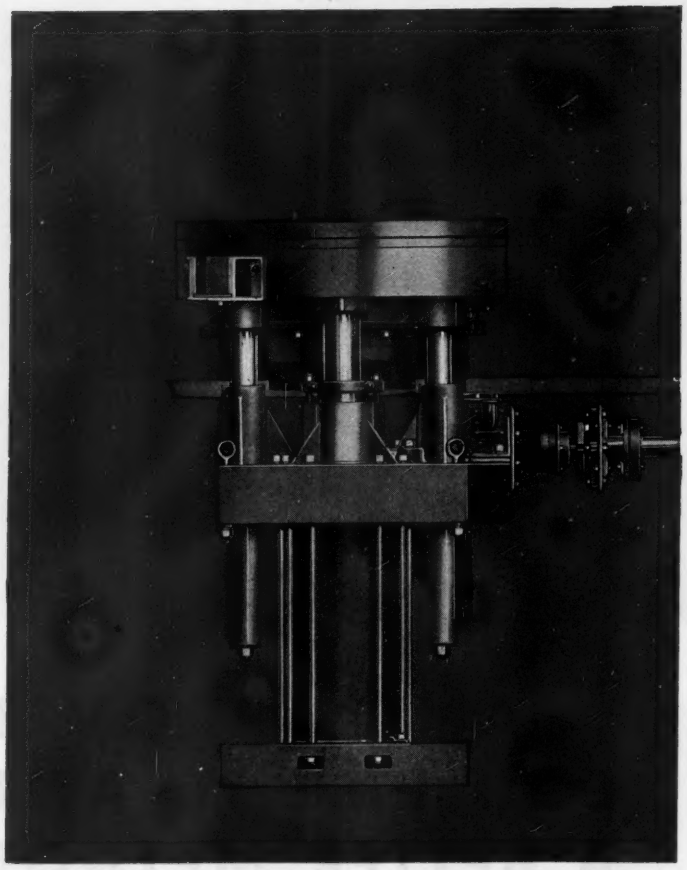


HYDRIL

ROTARY

TRADE MARK REG.
HYDRIL



7,411 feet of hard digging in 96 days . .

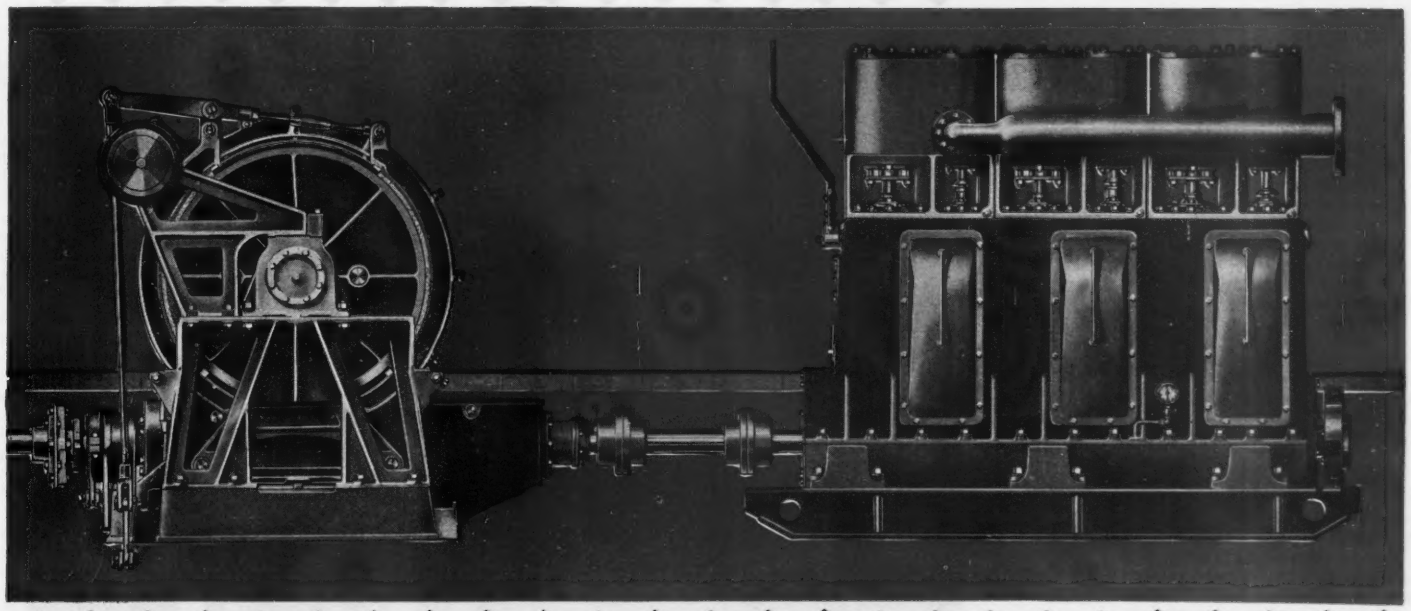
Note in illustration above how all power is transmitted by shafts under derrick floor. No chains or framing posts to obstruct the movement of the drilling crew, allowing speed with safety. Other HYDRIL advanced features include all-steel construction; shaft and cut gear drive; Timken roller and ball bearings throughout; force-feed and oil bath lubrication; all parts completely interchangeable.

New records for speed, safety, economy, depth and straightness of hole are being made with HYDRIL because this equipment represents the highest development of a new principle in oil well drilling machinery . . . positive bit pressure control, from spudding through to completion. The bit is fed uniformly and continuously, under absolute control of the driller, at the exact rate required for the best results with the formation penetrated.

DOHENY STONE

714 West Tenth Street, Los Angeles

DRAW WORKS—STEAM ENGINE



..with HYDRIL controlled drilling!

Straight Holes . . . and *Speed!*

Surveys of 255 typical wells drilled with ordinary equipment show that at 6,000 feet, departure from the vertical averaged 719 feet, with a minimum of 379 and maximum of 2,200 feet.

Contrast these records of HYDRIL performance: Janich No. 1 drilled with HYDRIL to 7,411 feet in 96 days was *practically straight!* Nelson No. 2 completed at 7,120 feet in 126 days departed from vertical only 43 feet!

These speed and depth records for *straight hole* drilling are not matched by any other equipment in the field. They are *not exceptional cases* . . . these HYDRIL records are being equalled or bettered by HYDRIL operators in every day's drilling!

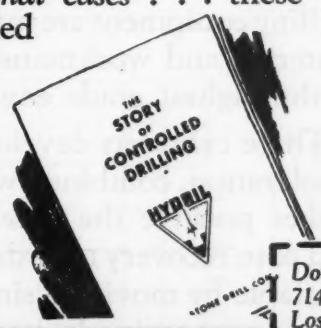
HYDRIL Records

Schwuchow No. 1, Los Angeles Basin
2,130 feet cored—87.4% recovery
Five 14-foot cores repeatedly taken in 24-hour periods at 5,000 feet

Janich No. 1, Signal Hill
7,411 feet drilled in 96 days
Cored last 1,000 feet—82% recovery
7⅞ hole with 5″ HYDRIL Flush Joint Drill pipe, 21.83 lbs. per foot, total weight 80.9 tons

Robinson No. 1, Kettleman Hills
6,510 feet of 14¾″ hole in 96 days
6⅝″ HYDRIL Flush Joint Drill Pipe, 27.7 lbs. per foot, total weight 88.9 tons

10 wells Poso Creek field
17,114 feet of hole in 10 wells, depths 1,540 to 1,819 feet, 1,711 feet average, *drilled with HYDRIL No. 2*
14.7 days average time per well



The Story of Controlled Drilling is a readable, profusely-illustrated booklet describing HYDRIL and its operation. Request your copy with coupon below.

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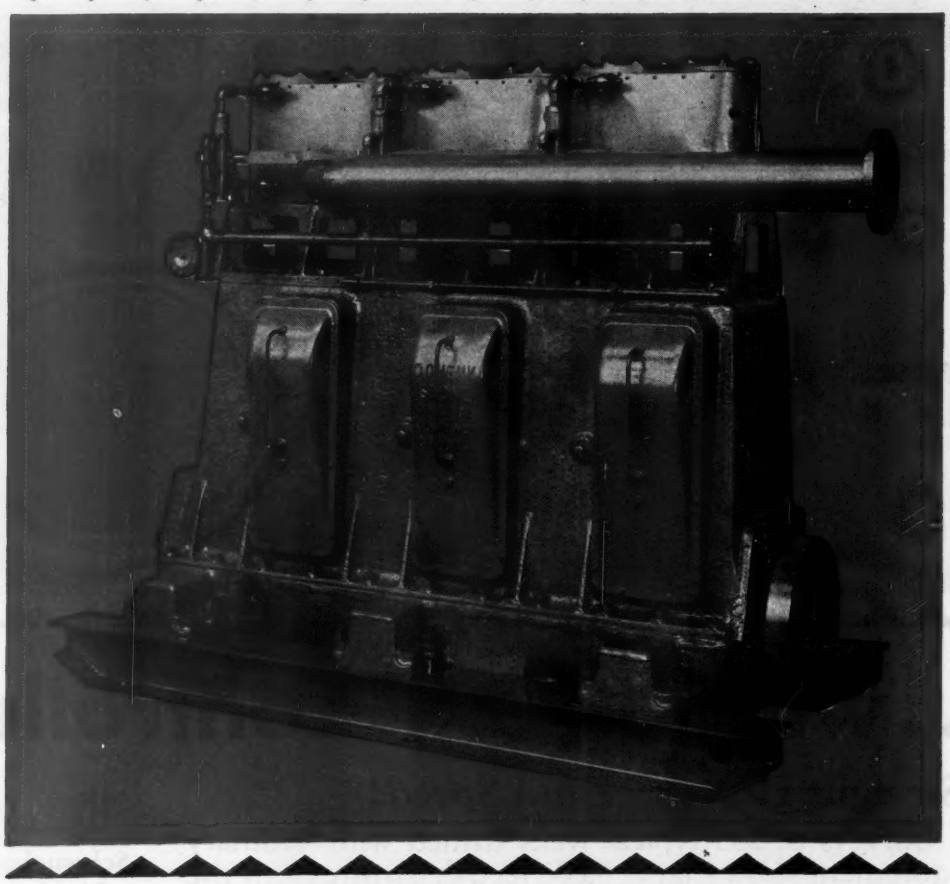
HYDRIL

THREE CYLINDER STEAM ENGINE



Efficient Power for HYDRIL Controlled Drilling!

Specifications

Vertical type, 320 h. p. at 320 r. p. m. and 150 lbs. pressure. Double acting piston valves, full force-feed lubrication.

Diameter of cylinders	10"
Length of stroke	10"
Number crank shaft bearings	7
Steam pipe to manifold	4"
Diameter exhaust pipe	3"
Exhaust manifold	6"
Diameter crank shaft	4⅝"
Diameter crank shaft pins	4⅝"
Diameter cross head pins	2½"
Diameter piston rod	2"
Diameter valve stem	1⅛"
Length over all	97"
Width over all	50"
Height	81"
Weight with steel skids	11,200 lbs.

The smooth, vibrationless flow of ample power delivered by the HYDRIL three-cylinder steam engine is the final important factor in the record-breaking performance of the entire equipment.

The advanced standards of HYDRIL over ordinary drilling equipment are maintained in this engine. Design, material, and workmanship are in every respect equal to the highest grade engines for power plant purposes.

Three cylinders develop maximum torque and rapid acceleration, combined with the smooth running which makes possible the exceptional HYDRIL bit control and core recovery records. The variable cut-off, instantly available by moving a simple lever, results in more than 26 per cent saving in steam consumption when drilling does not require the full 320 horsepower developed under full load.

Condensation Effect in Gas-Oil Ratio

Careful Measurements of Trap Gas Under Different Pressures and Almost Continuous Testing for Gasoline Content Necessary

By Alexander B. Morris*
Valuation Engineer, Forrest E. Gilmore Co., Tulsa*

At the 1928 meeting, Mr. Morgan Walker of the Amerada Petroleum Corp. presented a very complete discussion of the intermittent injection of gas in gas lift operations as opposed to continuous injection.[1] In it he presented a comparative table showing the effect on oil and gas production from the same wells under the two methods of operation.[2] This table carried a column showing the formational gas-oil ratios under each method, computed by deducting the volume of input gas from the volume of trap gas.

During the entire spring and summer of 1928 the writer had been engaged on some extensive test car tests of rich gas in Glenpool, seeking, primarily, for an explanation of the apparent loss of gasoline between the field meters and the plant master meter during the summer season. Tests at several of the field meters where the richest gas was obtained regularly failed to check with other tests on the same gas made further along the line, and the difference was not made up by the quantity of drip gasoline collected between the points. In the course of these tests the final outcome of which is immaterial to the present purpose, an attempt was made to construct a curve representing the relationship between gasoline content of the gas in gallons per 1,000 cubic feet and the shrinkage in the volume of gas treated as a result of removing the condensable fractions. Such a curve was made expressed in units of gallons per 1,000 cubic feet on the abcissa, and the ratio vapor volume to liquid volume on the ordinate. This curve is a rectangular hyperbol and shows that 3 gallons of gasoline taken from 1,000 cubic feet of raw gas occupied as a vapor very much less space per gallon than did 1 gallon taken from 1,000 cubic feet of another sample of gas. This is, in general, corroborated by converting to the same units the residue settlement curves prepared by the Tidal Oil Co., and by the Natural Gasoline Manufacturers Association, though the three curves, when plotted together, occupy quite different positions on the paper as shown in the accompanying plate.

TYPE OF COMPUTATION USED TO ARRIVE AT CORRECTED GAS/OIL RATIO

Line	Anderson No. 2—	Continuous flow		Intermittent flow
A	Barrels oil	1,077		1,123
B	Input gas, dry, M cu. ft.	1,516		906
C	Trap gas, wet, M cu. ft.	1,762		1,775
D	Apparent formational gas	246	(C — B)	869
E	Apparent formational G/O ratio	228	(D — A)	773
F	Assumed gasoline content of trap gas	1.5		2.5
	From Curve B, Figure 2:			
G	Residue in per cent of total	80		75
H	Dry gas returned to trap	1,410	(G × C)	1,331
J	Dry formational gas	—106	(H — B)	425
K	Gasoline vapor recovered	352	(C — H)	444
L	Gasoline vapor carried by new gas	$352 \times \frac{-106}{1,410} = -26$		$444 \times \frac{425}{1,331} = 141$
M	Gasoline vapor carried by input gas	$352 \times \frac{1,516}{1,410} = 378$		$444 \times \frac{906}{1,331} = 303$
	Vapor conditions at emergence from trap:	Dry gas + Gaso. vapor = Wet gas		Dry gas + Gaso. vapor = Wet gas
N	Input gas	1,516 + 378 = 1,894		906 + 303 = 1,209
R	Formational gas	—106 — 26 = —132		425 + 141 = 566
S	Total trap gas	1,410 + 352 = 1,762		1,331 + 444 = 1,775
T	Gas/oil ratio corrected for condensate	$\frac{-132}{1,077} = -122.5$		$\frac{566}{1,123} = 505$

COMPARISON OF GAS-OIL RATIOS, COMPUTED BY ORDINARY METHOD AND BY METHOD SUGGESTED

Basic Figures Taken from Table 1 in Mr. Walker's Paper

	Oil Bbls./day		Inlet gas volume M cu. ft./day		Trap gas volume M cu. ft./day		Formational gas/oil ratio Cu. ft. gas per bbl. oil Apparent		Actual	
	(*)	(†)	(*)	(†)	(*)	(†)	(*)	(†)	(*)	(†)
Anderson No. 2	1,077	1,123	1,516	906	1,762	1,775	228	773	—132	505
Cowden No. 4	1,087	1,124	1,525	1,070	1,750	1,760	207	613	—144	297
Nitey No. 3	986	1,024	1,301	897	1,365	1,135	65	232	—673	—54
Nitey No. 2	914	900	904	767	1,171	1,021	292	282	45	—3
Nitey No. 4	873	....	1,046	....	1,281	....	269	....	—30	....
Fixico No. 3	400	475	1,380	864	1,410	1,652	75	1,660	—787	1,052
Rentie No. 3	508	517	1,014	937	1,275	1,332	514	745	15	14
Killingsworth No. 3	326	290	966	860	1,082	1,130	367	932	—384	—55
Cowden No. 3	279	285	1,111	378	1,220	1,200	391	2,180	—602	1,505

*Continuous. †Intermittent.

Note.—Minus signs in Actual Gas/Oil Ratio column indicate actual repressuring of sand, where, by ordinary method of calculating gas/oil ratio, formational gas is being removed from sand.

Correction Needed

The bearing of all this on Mr. Walker's discussion of gas lift is this: that if the formational gas oil ratio is to be computed by deducting the input gas from the trap gas, then some correction must be made for the vapor volume picked up by the dry input gas on its traverse of the system. This may seem at first to be almost negligible, but a little figuring from the production data given by Mr. Walker, using one of these volumetric ratio curves, will show that the corrections are by no means negligible, and that they may even be so great as to indicate an actual repressuring of the well, where by ordinary methods of computation formational gas was being taken from it. In other words, it is possible that in many instances, the vapor volume of the gasoline carried from the well in the trap gas is greater than the difference between the volume of trap gas and the volume of input gas.

Unfortunately the writer has had very little opportunity to pursue these investigations in the field and to carry on prolonged observations of the behavior of wells under varying conditions. Hence, the present discussion is necessarily along academic lines. It was desirable, however, even for this approach, to determine a proper starting point or standard of comparison for the gasoline content of the trap gas. Charcoal tests were made at two wells of the Amerada Petroleum Corp. in the Seminole area. Trap pressures were varied and tests made at each of several different pressures with surprisingly regular results. These are shown in Figure 3. As the trap pressure is raised, the gasoline content of the trap gas fails.

Curves Explained

The parallelism between these curves for these two wells seem to indicate that the gas from each well constitutes a special set of conditions giving rise to a continuous curve for that particular gas. Probably analyses of these gases, sampled at the different pressures, would disclose the key to this behavior, but no such analyses were made. It is therefore necessary to neglect trap pressures altogether in this discussion, but to bear in mind that variations in trap pressures will vary the gasoline content of the trap gas. Let us assume, therefore, that trap pressures are constant under the two methods of production, and proceed to an analysis of some of the data submitted in Mr. Walker's paper. As he did not furnish any figures for the gasoline

(Continued on Page 202)

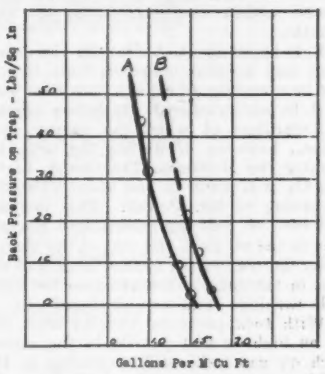


Figure 3—Effect of trap pressure on gasoline content of trap gas. Curve A: Hallum No. 4. Curve B: Anderson No. 2. Charcoal test made July 7 and 8, 1929.

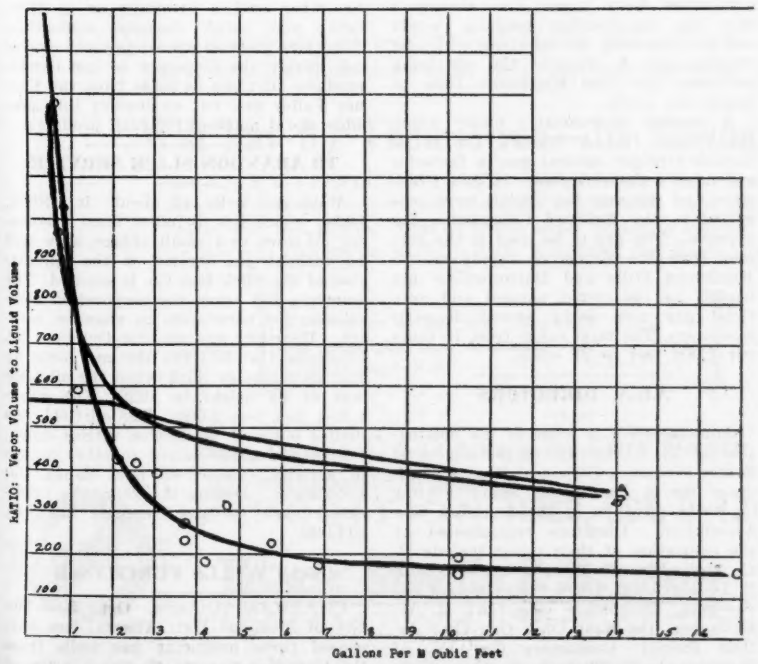


Figure 1—Gasoline condensation ratio. Vapor volume to liquid volume, showing substantial agreement in type of results. Curve A: From Natural Gasoline Association. Curve B: From Tidal Oil Co. Curve C: From truck tests by writer.

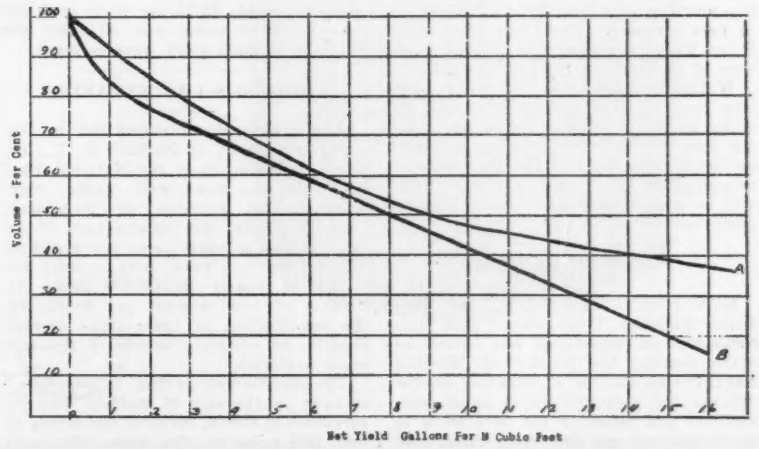


Figure 2—Gas conversion curves showing per cent of original volume remaining after extraction of gasoline. Curve A: Natural Gasoline Association. Curve B: Tidal Oil Co.

*Before Petroleum Division of American Institute of Mining and Metallurgical Engineers, Tulsa, October, 1929.

[1]"Intermittent Injection of Gas in Gas-Lift Installations," by Morgan Walker, Petroleum Development and Technology, 1928-29, p. 151.

[2]Ibid., p. 158.

Natural Gas Developments

Salt Water Drowns Gas in Some Wells In Muskegon Field

MUSKEGON, Mich., Oct. 5.—All but one of the dry gas wells from which the Muskegon Traction & Lighting Co. has been drawing natural gas from the Muskegon oil field for the use of domestic and commercial customers in Greater Muskegon, have been drowned out by salt water and the major portion of the company's supply now is coming from the West Michigan Consumers Co.'s compressor station.

The only one of a group of six or eight wells from which the traction company originally purchased and piped natural gas which is still flowing is the Lima Oil Corp.'s No. 2 Margaret Figge, SE NW, Section 9-10-16, Muskegon Township, on the Muskegon River flats.

Originally completed as an upper Traverse oil well the No. 2 Figge came in with a flow of 10,000,000 feet of gas per day on February 15, 1929, and is still good for a pull of about 400,000 feet a day by the traction company line in the lower Traverse pay sands at 1,870 feet.

The company is now purchasing about 1,250,000 feet a day from the field and sending out more than 1,000,000 feet a day to its customers. The rest is used for its own boilers.

The company has let the contract for the erection of a new 1,500,000-foot gas holder to Stacey Brothers, of Cincinnati, Ohio. Work of razing the old electric powerhouse to make way for the erection of the new holder is well under way. It is expected that the laying of the foundation for the new tank will be started within 30 days and the expansion completed within the next three or four months.

It is hoped by D. A. Powell, vice president and general manager, that it will not be necessary to change back from natural to manufactured gas before spring.

Regardless of when the change over comes, however, if during the next six months the Muskegon Traction & Lighting Co. will stand to lose about $150,000, according to Mr. Powell. This includes the cost of field equipment and the gas line to the oil field, the cost of the change over, the cost of the change back and the loss in earnings as compared to the probable earnings from manufactured gas.

With rock pressures varying from 100 to as high as 600 pounds to the square inch on gas wells still producing in the field, however, it is very difficult to determine when the change back to manufactured gas will be necessitated.

Dundee wells on the Muskegon River flats where some of the best gas production now lies vary from 100 to 300 pounds in rock pressure. The Lima Oil Corp.'s lower Traverse gasser has a rock pressure of slightly less than 600 pounds.

Wells throughout the field which have been making large quantities of gas are going to oil or salt water rapidly. In the case of the former, tubing and rods are being installed and the wells started pumping. It is expected that these wells will be pumping for months and perhaps years to come.

PETITION DENIED

SAN FRANCISCO, Calif., Oct. 5.—State Railroad Commission, with two commissioners dissenting, has issued an order denying the petition of Western Natural Gas Co. for a rehearing on the petition for a certificate of public convenience and necessity for permission to lay a natural gas line from Kettleman Hills to Contra Costa County, through the San Joaquin Valley. The original petition was denied on September 3. Attorneys for the company say further action will be taken, either in appealing for a writ of review to the State Supreme Court, or through a reopening of the hearing before the commission on the ground of new evidence.

NEWLY OPENED FIELD NEAR BLUE SPRINGS, MO.

KANSAS CITY, Mo., Oct. 7.—Between 12,000,000 and 14,000,000 feet of gas have been brought in during the past few weeks in a newly opened field, 5 miles southwest of Blue Springs, Mo. The field is close to Kansas City's east industrial district. Only about 18 wells had been drilled, B. R. Bay, general manager of the Missouri-Kansas Pipe Line Co., said. The company had about 7,500 acres leased in the field, Mr. Bay estimated.

That the field would be producing 35,000,000 feet open flow by December 1 was said by Mr. Bay to be a conservative prediction. About 1,500 acres of the leases have been proven up. The Bannister Ridge gas line will be extended to Blue Springs before freezing weather, Mr. Bay said. The new field is really a continuation of the Bannister Ridge Field, but probably would not connect with solid drilling. It was an unusually good field with the wells running close to 1,000,000 feet each but nothing unexpected, Mr. Bay said.

The gas that has been found so far has been sand gas. There are several gas-producing structures in the field.

COLUMBIA GAS & ELECTRIC CORP.

The board of directors of the Columbia Gas & Electric Corp. has adopted a resolution declaring the advisability of increasing the authorized common stock without par value from 10,000,000 shares to 30,000,000 shares. A special meeting of shareholders has been called to be held at Wilmington, Del., November 6.

The purpose of the proposed increase is to provide for the corporate needs of the corporation. After favorable action by the shareholders authorizing this increase, recommendation will be made to the board of directors for the use of a part of the additional stock in the declaration of a 25 per cent dividend on the common stock, payable in common stock after February 15, 1930, which will entitle the holders thereof to the May dividend; the holders of the outstanding subscription receipts of the corporation to be entitled to this dividend in respect to the stock received by them upon completion of their subscriptions.

At the same meeting quarterly dividends of $1.50 per share of 6 per cent preferred stock, $1.25 per share of 5 per cent preferred stock, and 50 cents per share of common stock were declared.

IROQUOIS GAS EXPANDS

A new expansion program for the Iroquois Gas Corp., of Buffalo, N. Y., one of the subsidiaries of the National Fuel Gas Co., is now well under way. Through the purchase of by-product coke oven gas, the construction of an entirely new manufacturing gas works on Mineral Springs road, with a daily capacity of nearly 20,000,000 feet, the drilling of new natural gas wells and the construction of three large storage holders, an adequate supply of gas was made available.

The distribution system to supply all sections in the city of Buffalo, and its surrounding towns, involved the laying of over 500 miles of pipe lines. The construction of these lines has added upwards of 40,000 new accounts.

PROMISE SAN FRANCISCO DOMESTIC GAS BY JULY

LOS ANGELES, Calif., Oct. 5.—Straight natural gas from Buttonwillow and Kettleman Hills oil fields can be distributed to domestic consumers in the San Francisco Bay district by July 1, 1930, A. F. Hockenbeamer, president of Pacific Gas & Electric Co., informed the Railroad Commission, if the company's application for a permit to construct its second pipe line from the fields is granted. Date might be advanced, he said.

The second pipe line is projected through the San Joaquin Valley. Pending its completion, the company expects to serve the bay district with a 700 B.t.u. mixture of natural and artificial gas, for which rates now are in process of determination.

Claude Brown, gas administrator for the Railroad Commission, submitted a rate schedule considerably lower than that asked by the Pacific Gas & Electric Co. for this mixed gas, which would cut receipts $1,250,000 a year below the figure the company is asking, it is estimated. Brown's schedule set 80 cents per 1,000 feet for consumers using 500 feet or less per month. The company's present rate is 90 cents a month for the first 10,000 feet. In its application covering the service of mixed gas, which is expected to be served to all consumers by November 1, the company proposes to retain approximately the same rate for small consumers, making substantial reductions to those using larger quantities.

Mr. Hockenbeamer said his company does not expect to use natural gas from Kettleman Hills until necessary, as contracts with the Milham Exploration Co. and The Texas Company for Buttonwillow gas will supply enough for some time to come. The Pacific Gas & Electric Co. also has contracts with the same companies for gas from Kettleman Hills and also with the Standard Oil Co. of California and Shell Oil Corp. for gas from Kettleman Hills.

In discussing natural gas conservation, Mr. Hockenbeamer declared that while he approved of the law, his company took the position that oil companies which have contracts to supply the gas should live up to them. He said Federal authorities have given him assurance that the conservation program would not be permitted to interfere with the Pacific Gas & Electric Co. obtaining sufficient gas from Kettleman Hills to supply its needs.

A number of contracts under which the Pacific Gas & Electric Co. is to furnish straight natural gas to factories and other industrial plants in San Francisco and the east bay region were submitted to the Railroad Commission for approval. The gas to be used is the surplus from the source of supply at the Kettleman Hills and Buttonwillow not needed for the mixed natural and artificial gas now being served domestic consumers. The rates range from 15 cents per 1,000 feet to 24 cents.

A.G.A. DIRECTORS

Announcement is made of the nomination of F. T. Hulswit of the American States Securities Corp. and Fred A. Miller of the S. R. Dresser Manufacturing Co. to be directors of the American Gas Association. Directors renominated at the expiration of their terms include H. C. Abell, Electric Bond & Share Co.; J. S. De Hart, Jr., Isbell-Porter Co.; F. C. Freeman, Providence Gas Co.; R. W. Gallagher, the East Ohio Gas Co.; Arthur Hewitt, Consumers Gas Co. of Toronto; A. B. Macbeth, Southern California Gas Co.; T. N. McCarter, Public Service Electric & Gas Co.

FURTHER RESTRICTIONS TO PREVENT GAS WASTE

Legislation to prevent waste of gas in Panhandle fields was proposed at a conference of 17 deputy oil and gas supervisors, presided over by R. D. Parker, chief of the division in Austin.

The Railroad Commission, under which the division operates, has gone as far as it can to conserve the gas supply under present statutes, it was explained, and to impose further restrictions the laws would have to be remedied. It was reported natural gas amounting to many millions of feet is escaping daily. Parker said that as one conservation regulation carbon black plants are allowed to use only casinghead products.

An enormous quantity of gas escapes by leakage through inadequate pipes, it was represented, the smaller pipe lines having insufficient facilities.

The oil and gas conservation law passed by the Forty-first Legislature came in for discussion, along with rules for its enforcement.

Deputies attending the meetings are Leslie McKay of Austin, W. P. Laughter of San Antonio, G. H. Reiger of Houston, R. C. Lomax of Beaumont, F. H. Pierson of Corsicana, I. J. J. Killough of Eastland, Omar Burkett of Cisco, G. W. Tilley of Olney, T. L. Coplin of Wichita Falls, J. D. Martin of Electra, J. T. Elliott of Amarillo, John Hoffer of San Angelo, J. F. Fouch of Laredo, J. M. McDonald of Pampa, and J. A. Morehouse of Fort Stockton.

WASTE GAS INVESTIGATION

CHATHAM, Ontario, Oct. 5.—R. T. Elsworthy, technical director of Industrial Processes, Ltd., of Kingston, Ontario, arrived in Calgary recently to spend two months in investigation of the Turner Valley waste gas situation. He is accompanied by a trained staff, and the investigation is being carried on under the special commission appointed recently by the dominion and Alberta governments.

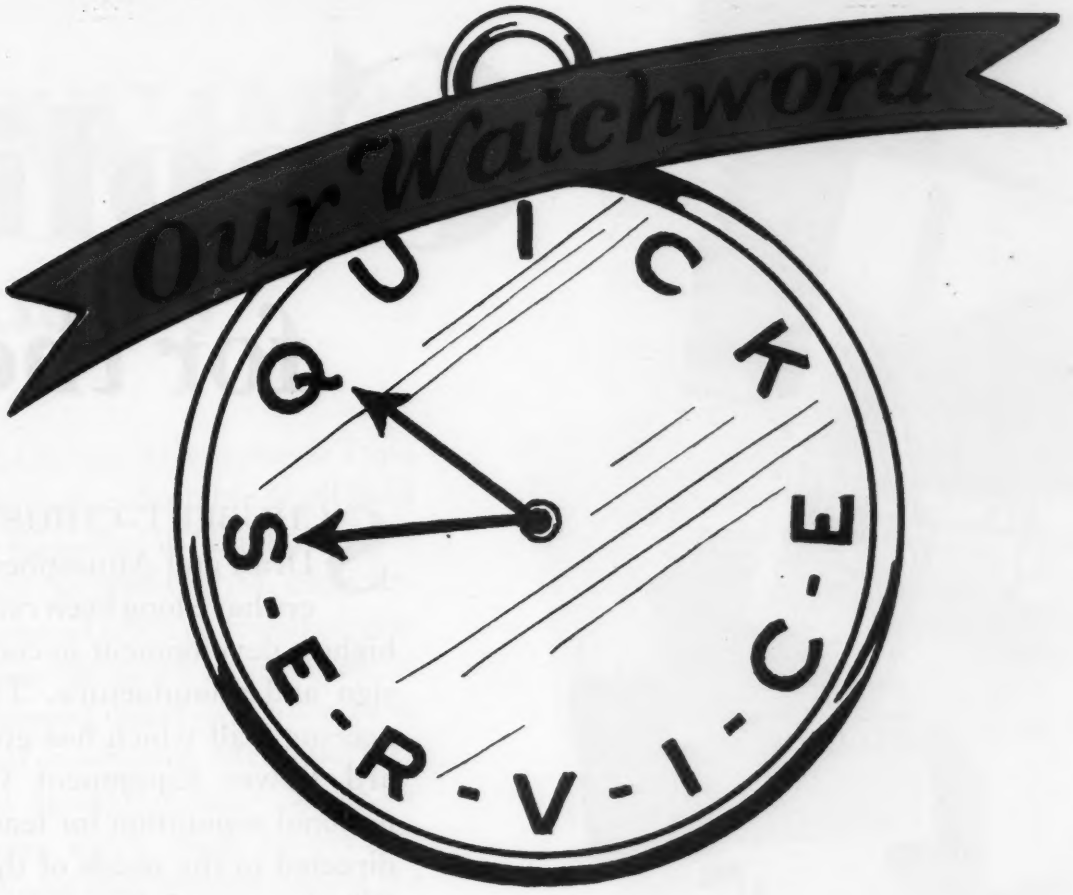
Three separate lines of investigation will be followed by Doctor Elsworthy and his staff. These will be, first, storage of waste gas in exhausted fields; second, long-distance pipe line transmission, involving the marketing of surplus gas in the other prairie provinces or in Montana; and, third, chemical utilization. The third field of investigation involves not merely the discovery of commercial products that can be made from the Turner Valley gas, but an inquiry into possible world markets for such products.

TO ABANDON SLICK SERVICE

With gas wells all about it, Slick, Okla., which has dwindled from a booming oil town to a small village, soon will be without gas service, if the application of the Slick Gas Co. is granted. The company has asked the corporation commission for permission to abandon service. Hearing was set for October 22. Capitalized at $20,000, the gas company laid its mains in Slick when the oil field was at its height in 1922. The population then was 3,000. The oil field was drilled out and production settled down. Oil field workers moved to other scenes of activity. The town now claims 150 population. During the year, the application said, the gas company has lost $17,992.

GAS WELLS PURCHASED

CHATHAM, Ontario, Oct. 5.—The city of Medicine Hat, Alberta, has purchased three producing gas wells from the Canadian Cement Co., at a price of $10,000. The wells have already been connected with the municipal gas system.



Speed, too with the B.S.&B. Perfection Vapor Pressure TANKS

You need speed when you need an oil tank. You get it with a B.S. & B. PERFECTION. There's a SERVICE ARMY maintained in order to give you prompt and thorough service — and still you don't have to pay anything extra for it!

Two hundred and twenty-eight trucks and service cars, capable tank crews, 50 field stations carrying complete stocks, and a fabricating plant centrally located, are maintained at all times to be alert to our watchword.

We make the tanks, ship them "knock down" and erect them ourselves on your lease—not by untrained men, but our own trained crews kept ever on the job. That's the type of service we are able to give you!

Will Pay for Themselves—By Saving that Loss!

The B.S. & B. PERFECTION TANKS will prevent loss by evaporation, keep it as it comes from the well and allow you to deliver it to the pipeline at well head gravity. Thus no loss in either quality or volume! Thus the tank will soon pay for itself! It is the Watch Dog that guards your oil.

We've more to tell you. May we? There's a man near you, and a catalog ready to mail. Address Dept. B-2.

See Tanks On Display At Our Booth

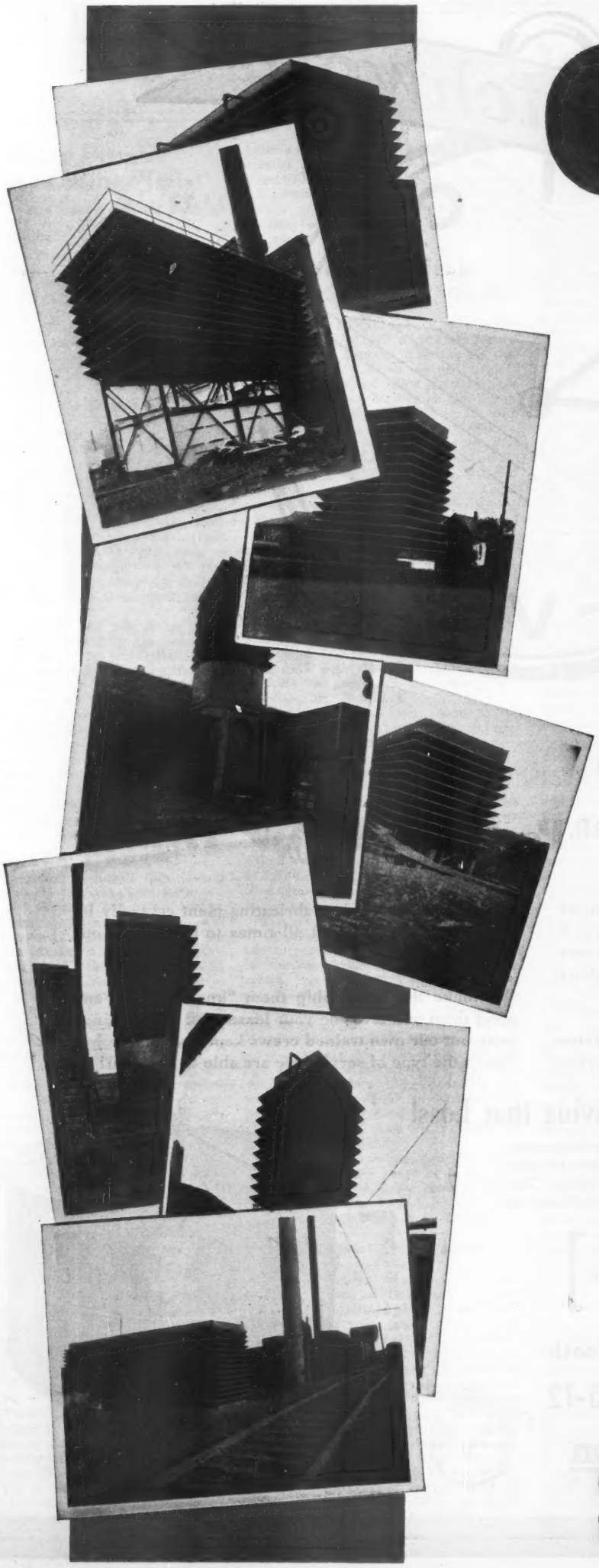
X International Petroleum POSITION Tulsa, Oct, 5-12

EFFICIENT B S & B SERVICE DEPENDABLE

Black Sivalls & Bryson INC.

BARTLESVILLE - OKLAHOMA

Our Watchword QUICK S-E-R-V-I-C-E



Cooling for the Oil

SCHUBERT-CHRISTY Forced Draft and Atmospheric Type Towers have long been recognized as the highest development in cooling tower design and manufacture. The same engineering skill which has given the Standard Power Equipment Corporation a national reputation for leadership is now directed to the needs of the oil industry. Whether your interests be that of a large refinery — gasoline plant — or pumping station in the field there is a Schubert-Christy Tower of correct type and proportion to answer your water cooling requirements.

The cooling tower engineering counsel, that is part of Standard Power Equipment Corporation service in the installation of the correct unit for each individual problem, is now available at our new Tulsa, Oklahoma, office.

Supporting the engineering service of our Tulsa office—our mill capacity and plant efficiency insure both promptness of shipment and attractive price in meeting your individual cooling tower needs.

STANDARD POWER

Executive Office and Plant

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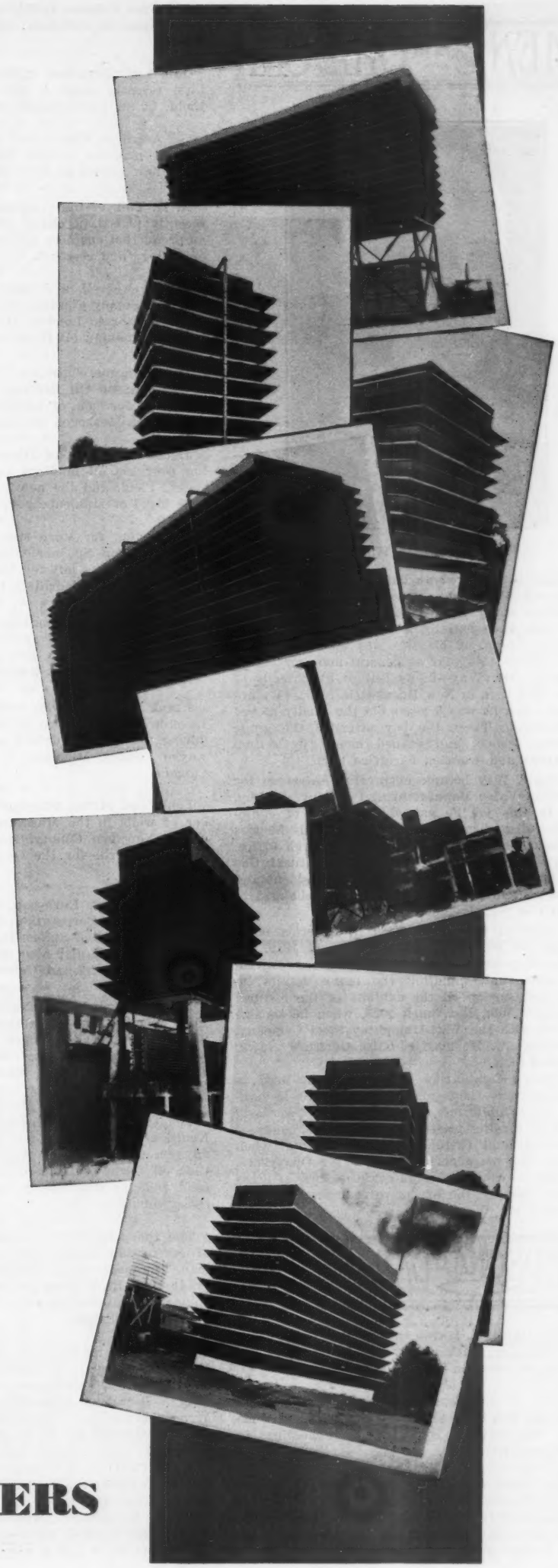
SCHUBERT

Towers Industry

The Schubert-Christy Atmospheric Type Towers particularly adaptable to oil field problems are furnished in Standard Units from 10 G.P.M. to 5000 G.P.M. capacity. The combination of units as required provides capacities for every need. Built of Cypress, Redwood, Steel or Concrete to best meet local conditions. Metal parts of Rust-Proofed Steel, Bronze, Copper, or Lead. Louvers extra deep to prevent spray loss. Water distribution system the most effective yet developed. Designed to operate successfully under adverse weather conditions, under sustained overload periods, with waters containing solids, acids, or alkali.

The Schubert-Christy Forced Draft and Schubert-Christy Combination Natural and Forced Draft types have inherent ability to cool relatively large quantities of water through a large temperature range under unfavorable atmospheric conditions.

Call on us for a technically correct recommendation for your own water cooling problems.



EQUIPMENT CORP.
St. Louis, Missouri
NATIONAL BANK BUILDING

CHRISTY TOWERS

MEN KNOWN IN OILDOM

William B. Way

William B. Way, whose handling of the 1929 International Petroleum Exposition and Congress, has added many friends to the hundreds he already had, is essentially a product of Pittsburgh, Pa., where most of his life was passed until he went to Tulsa this year as general manager of the Exposition. Mr. Way—he is Bill to his friends of course—was born in New Brunswick, N. J., 44 years ago and when he was 5 years old the family moved to Pittsburgh. There the boy attended the grade and high schools and earned money by selling newspapers and working as office boy.

At 20 Mr. Way became a traveling salesman for the Ludlow Valve Manufacturing Company, of Troy, N. Y. In this job he gained knowledge of equipment for oil and gas fields, and eventually he was made manager of the company's Pittsburgh office. He was active in the work of the Natural Gas Men's Supply Association, serving as president and later as secretary when the name was changed to Natural Gas Supply Men, Inc.

The Natural Gas Association of America made Mr. Way its secretary and treasurer in 1919. He made arrangements for the organizations conventions after that, handling the many details involved, and supervised the exhibits of the Natural Gas Supply Men, Inc., until 1926, when he became identified with the Witt-Humphrey Steel Company, Greensburg, Pa. He married Miss Gertrude Hawk of Pittsburgh.

Mr. Way's familiarity with equipment used in the oil and gas fields and his experience in handling big exhibits of such equipment peculiarly fitted him for the position of general manager of the International Petroleum Exposition, and when J. Burr Gibbons, general manager for two years, announced he could not serve again because of press of other business, the executive committee promptly engaged Mr. Way.

PERSONAL PARAGRAPHS

Harvey Hardison, petroleum engineer of the California Company, with offices at Midland, Tex., is spending his vacation in California.

* * *

Judge J. M. Stephenson, Winchester, Ky., president of the Rex-Pyramid Oil Company, spent some time looking over the company's large holdings in Ohio County, Kentucky.

* * *

Warner Clark and family are visiting at various places in California, Mr. Clark's home state. He is in charge of the California Company's offices in Dallas, Tex., and manager of the company's activities in that district.

Sir John Cadman, G.C.M.G., chairman of the Anglo-Persian Oil Company. has been on vacation in France.

* * *

James C. Ellis, one of Kentucky's active operators, recently spent a short period in the Dupo Field, in St. Clair County, Illinois.

* * *

Sir Adam B. Ritchie has resigned his position as general manager of the Turkish Petroleum Company, now known as the Iraq Petroleum Company.

* * *

A. H. Bell, of the Continental Oil Company, was recently placed in charge of California properties as production engineer and R. M. Barnes in charge of geology and research.

* * *

E. W. Criswell, a director and secretary of the Oil Well Supply Company of Pittsburgh, Pa., was a recent visitor to London. Mr. Criswell paid a visit to the Rumanian oil fields using the air route.

* * *

J. J. Johnson, chairman of the board of directors of the Johnson Oil Refining Company, of Chicago, and Carl Morrison, of Lawrenceville, Ill., were visitors in the Muskegon oil field.

* * *

James H. Bright, of Miami, Fla., has been looking over his oil holdings in the Owensboro, Kentucky, Field, and the new producers in the Greenville Field of Muhlenberg County.

* * *

Al Barton, for some time in charge of drilling operations for Spooner Oils, Ltd., in the Turner Valley Field, has left for New Zealand to join the staff of a diamond drilling company.

* * *

James A. Talbot, chairman of the board of the Richfield Oil Company of California, recently received delivery on his new $600,000 Diesel driven yacht Carissime, which was constructed in Germany.

* * *

Frank H. Stover, who drilled several wells in the Laketon Township area of the Muskegon Field and during the summer drilled several wildcats in Newaygo County, Michigan, is preparing to drill in Canada.

* * *

Lentz and Miller, who have drilled a large number of wells in the Muskegon Field and one wildcat in Newaygo County, Michigan, are moving to Canada to drill for the Ontario Gas & Petroleum Company.

* * *

W. B. Goldey, European manager of the Lucey Manufacturing Corporation, is making an extended visit to the United States. He will visit the various Lucey factories, and also the oil fields of Texas, the Mid-Continent and California.

* * *

Mr. and Mrs. Byron Trammell have returned to Fort Worth, Tex., from their honeymoon in Hot Springs, Ark. Mr. Trammell is connected with the Gulf Production Company's Fort Worth office. Mrs. Trammell was formerly Miss Reinzena Pendery of Fort Worth.

* * *

County Judge W. S. Adams, of Magoffin County, Kentucky, and a resident of Salersville, spent a few days in the Owensboro Field, looking up his oldtime oil friends who used to operate in the Weir sand field of that county and other eastern Kentucky counties.

* * *

The Independent Oil & Gas Company is opening offices in San Angelo, Tex., with H. H. Beck, land man, in charge. C. A. Daniels will be in charge of production, R. J. Giles the paleontologist, and Mr. Hendricks transferring from Oklahoma to scout the West Texas district.

* * *

F. F. Hill, manager of field operations of the Union Oil Company of California; L. B. Little, of the Standard Oil Company; and A. S. Hayes of the General Petroleum Corporation, have been re-elected as members of the California Oil and Gas Commission for District No. 1.

* * *

W. C. (Bill) Taylor resigned from the Frick-Reid Supply Corporation, October 1, and is now with the International Derrick & Equipment Company, mechanical department, Mid-Continent division. Mr. Taylor has worked all boom fields west of the Mississippi River and is widely known to field men.

Forrest M. Towl, president of the Southern Group of Pipe Lines, Allan T. Towl, vice president of the same group, New York; V. S. Swisher, secretary; H. C. Dorworth, solicitor; and D. L. Thomas, agent, were Pittsburgh, Pa., visitors recently.

* * *

J. A. Geiger, Winchester, Ky., general superintendent of the Cumberland Pipe Line Company; William Keffer, superintendent of the same company, and E. W. Meckline, Parkersburg, W. Va., general superintendent of the Eureka Pipe Line Company, attended the quarterly meeting of that company.

* * *

A. Mellar has been appointed manager of the fuel oil division of the sales department of the Standard Oil Company of New Jersey. Mr. Mellar succeeds Gordon H. Michler, who has been transferred to Paris as a director and general sales manager of L'Economique Societe Anonyme de Petrole et Essence.

* * *

Glenn Skinner, secretary-treasurer, Black Sivalls & Bryson, Inc., left on September 26 for an extended hunting trip in the province of Nova Scotia, Canada. In the hunting party in addition to Mr. Skinner were Ralph Feagle, Doctor Bower of Fort Wayne, Ind., and Ed Jackson, former governor of the State of Indiana.

* * *

Noah Sark, field superintendent of the Johnson Oil Refining Company, of Chicago, may be transferred from the Muskegon, Michigan, Field, where he has had charge of company operations for the past 18 months, to Oklahoma fields. If he is transferred, Carl Morrison, former independent operator, will take his place.

* * *

Miss Margaret Munro Elder and Fayette B. Dow were married at Grey Rocks, Winchester, Mass., on October 1. Mr. Dow is general counsel of the National Petroleum Association and Washington Counsel of the American Petroleum Institute and the Western Petroleum Refiners Association. Mr. and Mrs. Dow will be at home at The Kenesaw, Washington, D. C., after November 15.

* * *

Count F. de Roussy de Sales, of Calgary, Alberta, president of the Turner Valley Oil Company and the Turner Valley Exploration Company, has left for Paris, France, where he will join the law firm of S. G. Archibald & Company. Mr. de Roussy has been associated with the Alberta oil development for many years, in addition to practicing law in Calgary and for a time holding the office of French consul.

* * *

Charles R. Fettke, professor of geology at the Carnegie Institute of Technology, Pittsburgh, Pa., W. A. Copeland, assistant professor, and W. H. Seifert completed the field work on the geological survey of the Bradford oil field of northwestern Pennsylvania and adjacent portion of New York State during the past summer for the Pennsylvania Topographic and Geologic Survey, and have returned to Pittsburgh.

* * *

Herman Layer, executive vice president, and William F. Young, president of the California Mammoth Oil Company, Ltd., accompanied by Juan J. Ruiz, commissioner of education for the Republic of Nicaragua, and Franz Brockmann, merchant and inspector of Nicaraguan consulates on the Pacific Coast, and William C. Marshall, consulting engineer for the oil company, sail October 10 for Nicaragua, where they will inspect the oil developments which the company is carrying on.

* * *

Scott Turner, director of the United States Bureau of Mines, sails from San Francisco, Calif., on October 10 to attend the World Engineering Congress at Tokio, Japan. He was appointed by President Hoover as one of five Federal engineers to represent the United States Government. Mr. Turner also holds a commission to represent the American Committee of the World Power Conference. He is the official delegate of the Canadian Institute of Mining and Metallurgy at the Congress, carries credentials from the University of Michigan and also the Michigan College of Mining and Technology as official representative of those institutions, and is listed as a member of the official party representing the American Institute of Mining and Metallurgical Engineers. He plans to return to the United States the latter part of November.

The original Hughes Rock Bit and Cones, introduced to the industry nearly 20 years ago, made it possible for the Rotary operator to successfully drill hard formations.

Hughes Rock Bits and Cones are recognized throughout the Rotary Fields of the world as the safest, fastest and most economical drilling bits available to the industry

In the future the leadership of Hughes Rock Bits and Cones will be just as evident as it is today.

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85-170 B.H.P. ENGINE COMPRESSOR

BUILT AS SINGLE OR TWIN UNIT

TYPE 80

ALTHOUGH existing types of Cooper engine compressors are performing in a manner thoroughly satisfactory to owners and operators, Cooper-Bessemer engineers are constantly seeking ways to make these units still better. Out of scientific research, laboratory tests, advanced engineering, modern equipment and materials, has been developed a new and improved Type-80—an engine compressor that offers even greater value than the models preceding it.

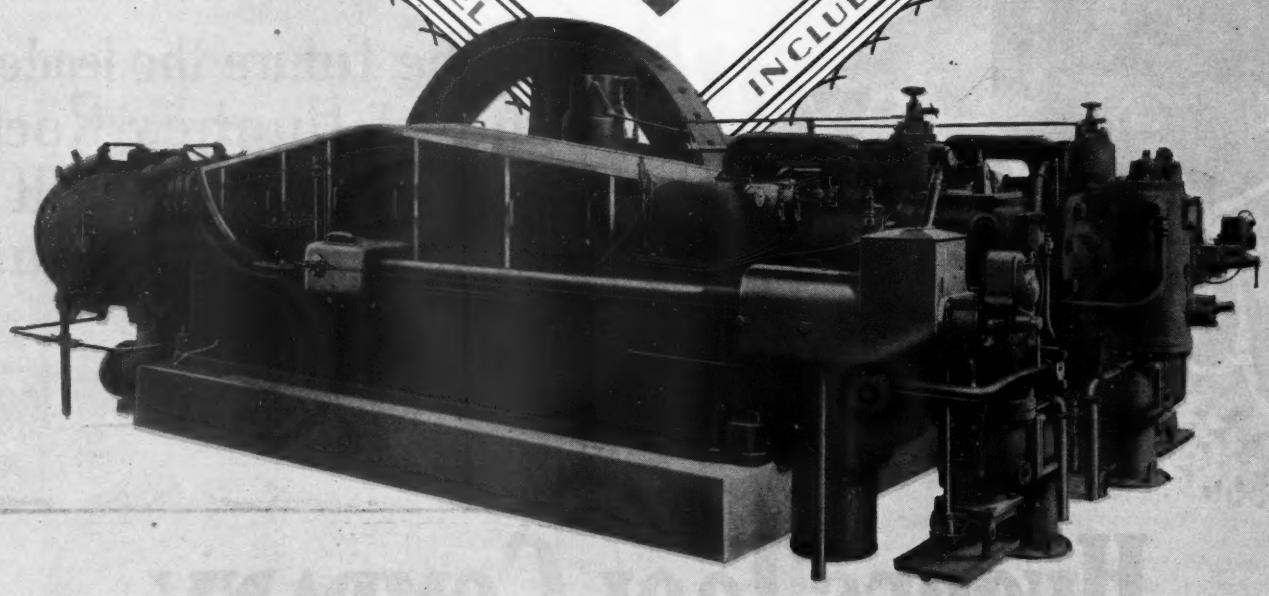
Some of the refinements found in the new Cooper Type-80 are: a new and better breather compartment; special heat-resisting exhaust valves; longer power cylinder liners; larger inlet valves; improved exhaust chambers; better water cooling throughout, and more efficient compressor cylinder valves.

The New Type-80 is looked upon as simply a larger Cooper built smaller - with every detail cared for to insure lasting, economical and dependable operation. It is the 4-cycle, horizontal, direct-drive type, built as a single cylinder—85 B.H.P., and as a twin cylinder—170 B.H.P.

Its chief applications are air and gas lift, gas boosting, gasoline extraction from gas, gas compressing, handling still vapors and weathering gases in refineries, air compressing, and repressuring oil sands. *Write for Bulletin entitled* - "THE NEW AND IMPROVED TYPE-80 COOPER GAS ENGINE COMPRESSOR."

MANY IMPROVEMENTS IN NEW MODEL

INCLUDES LARGE ENGINE FEATURES



THE COOPER-BESSEMER CORPORATION

50-60 B.H.P. ENGINE COMPRESSOR

CONVERTIBLE GAS OR OIL ENGINE

TYPE 16

THE first Cooper Type-16 engine compressor units built have been in use over two years. With the exception of a few changes and refinements which were found necessary, these units have been practically free from trouble.

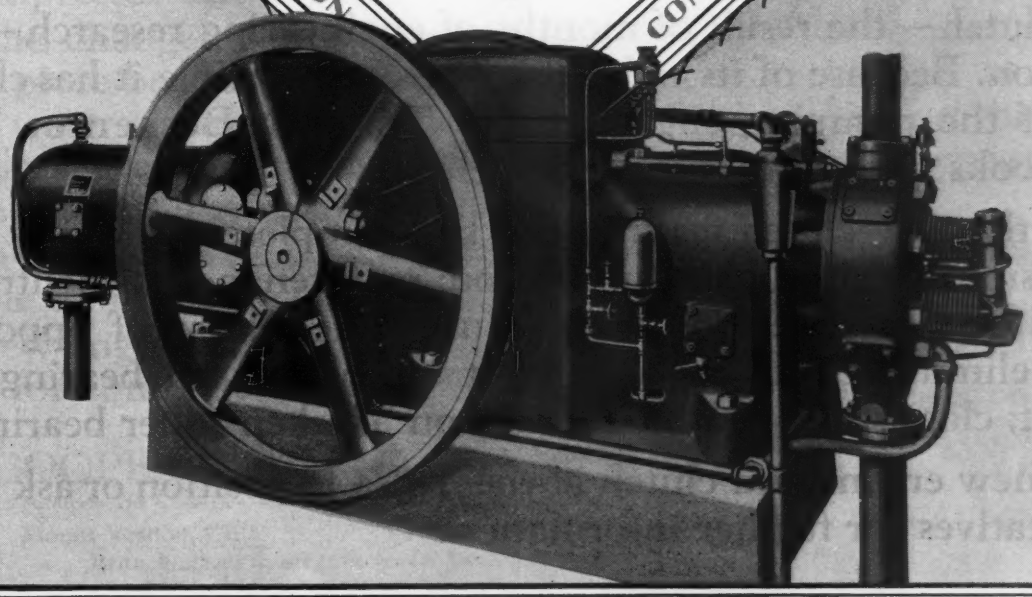
Type-16 is small, compact, self-contained—the engine and compressor being built into one direct-drive unit. It is rated at 50-60 B.H.P., depending upon the speed. The unit is shipped completely assembled, and is readily convertible for either gas or Diesel operation. Using single or two-stage compressor cylinders, its range is from 26 inches of mercury vacuum suction to 2000 pounds discharge pressure.

Type-16 has the fuel economy inherent in 4-cycle engines; its semi-automatic operation effects a material saving on labor; rugged parts and solid construction reduce maintenance costs; and the consumption of lubricating oil is low.

Within its power rating, its applications are the same as for Type-80, plus belt-driving power equipment. *Write for Bulletin entitled*—"COOPER TYPE-16 COMPRESSOR UNIT."

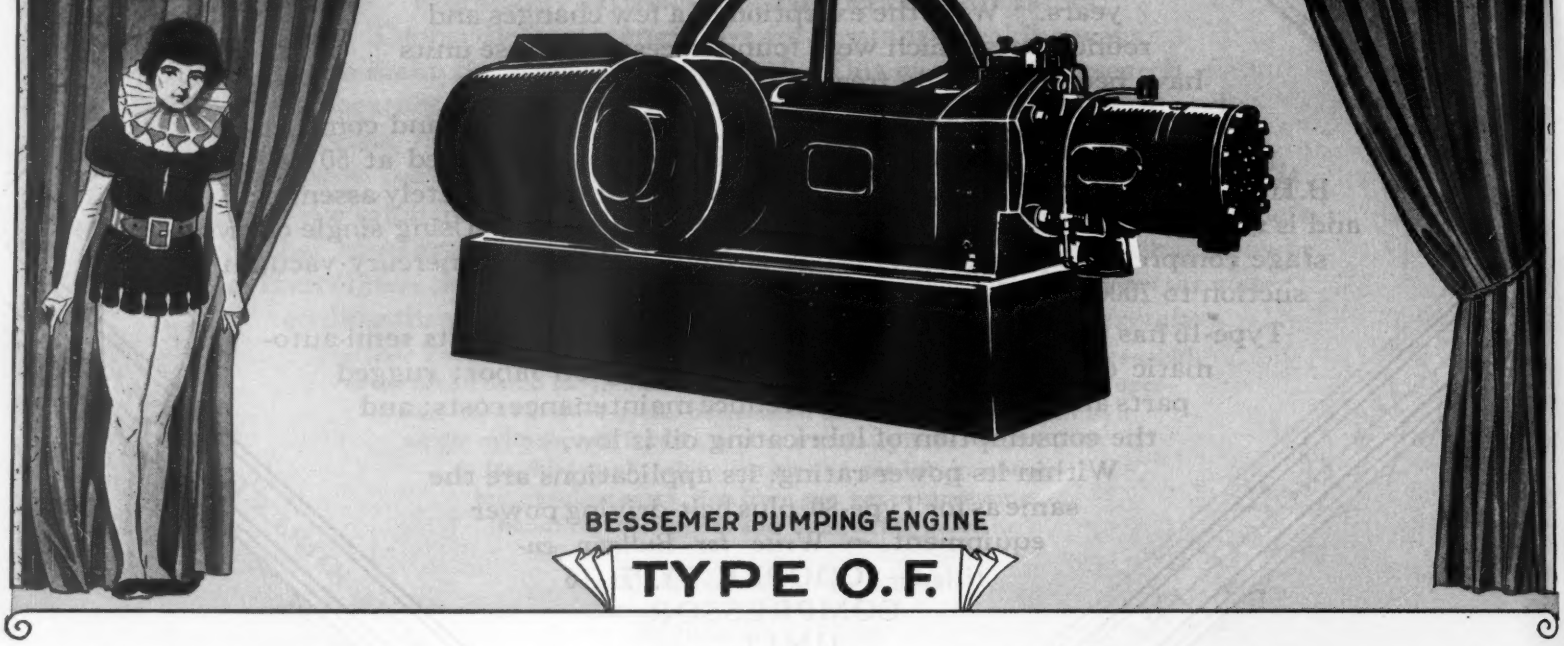
PRACTICALLY TROUBLE-FREE OPERATION

COMPACT BECAUSE DIRECT-CONNECTED



MT. VERNON, OHIO & GROVE CITY, PENNA.

And They All Replied— "A Better Clutch!"



"WHAT is the most needed improvement in pumping engines?" we asked engineers, superintendents and operators in the field. The answer was nearly unanimous—"A better clutch!"

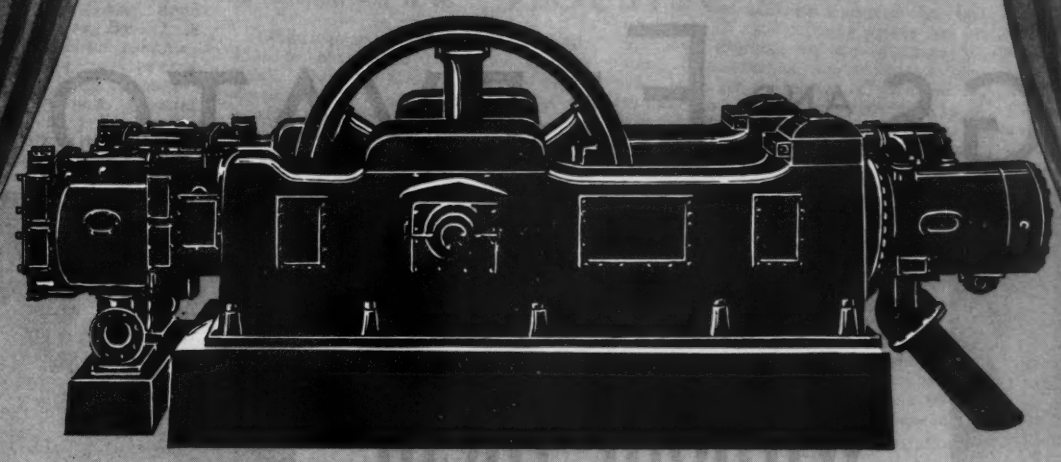
A new clutch—the result of months of engineering research—is now in production. Because of its radically different principle it has changed the design of the pumping engine itself. The new Bessemer Type-O. F. neither looks nor is like the old model.

Some of the new clutch features are: the complete enclosure of shifting mechanism and its oil bath lubrication; maintenance of neutral position by centrifugal balance; positive and unfailing release of opposite clutch motion; elimination of misalignment by making all bearings part of a rigid unit; close support of belt pulley on Timken roller bearings.

See this new engine and clutch at the Tulsa Exposition or ask one of our representatives for further information.

CUDDIER

Have You Heard About The New Bessemer Type-10?



BESSEMER ENGINE COMPRESSOR

TYPE 10

COOPER-BESSEMER engineers in their constant search for engine improvements decided that several important changes would overcome certain difficulties discovered in the old model Bessemer Type-10 engine compressor unit.

Some of the changes which have made this a NEW Bessemer Type-10 are: a one piece bed; a full water jacket from cylinder end to end, and improved water circulation; increased exhaust and inlet port capacity and wider bridges; greater scavenging valve capacity; improved type piston and cylinder head; and better lubrication for exhaust bridges.

Built with a Bessemer gas economizer, this new Type-10 has fuel economy comparable to a four-cycle engine.

See this new engine at the Tulsa Exposition or call in one of our representatives for complete information.

THE COOPER-BESSEMER CORPORATION

Formerly The C. & G. Cooper Co. and The Bessemer Gas Engine Co.

Mount Vernon, Ohio Grove City, Pennsylvania

Branch offices in all principal oil and gas fields

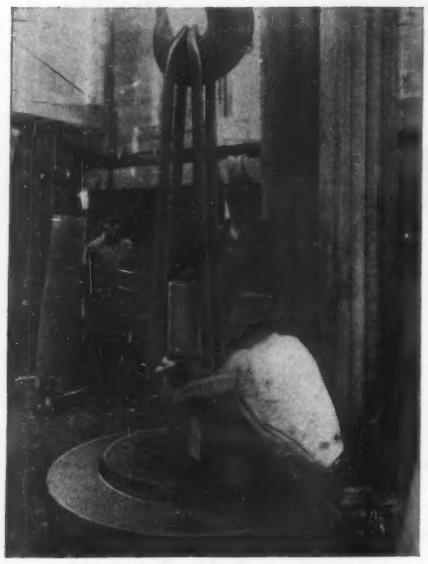
BESSEMER

"BJ"

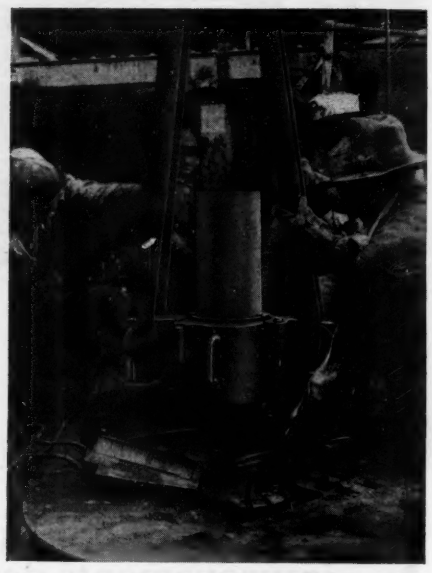
WILSON

TONGS AND ELEVATORS

DUNN



The derrick without them is not 100% efficient....



BJ Slip-Grip Casing Elevator (Formerly Dunn)

BJ Safety Casing Tongs (Formerly Dunn)

"Use a "BJ" and get a Better Job"

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New York City
1245 Graybar Bldg.

Houston, Texas
1915 Post Dispatch Bldg.
Fort Worth, Texas
814 Dan Waggoner Bldg.

Technical Questions Answered

BY CHARLES K. FRANCIS, PH.D., TECHNICAL EDITOR

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible so as to assure a satisfactory answer.

All inquiries should be signed and if other than the given initials are to be used please indicate the desired letters.

Questions involving patented processes, intricate formulas and calculations and estimates of costs, for obvious reasons, cannot be answered. The replies will appear on this page within a reasonable time.

SATURATED AND UNSATURATED HYDROCARBONS

Will you be kind enough to give me an explanation of the difference between saturated and unsaturated compounds mentioned in connection with petroleum products? I never studied chemistry and hope that you can give me this without very much technical detail.—E. N. P.

The words saturated and unsaturated have about the same meaning in chemistry that they have in ordinary every day life and their use when describing the compounds of carbon and hydrogen, called hydrocarbons, is quite common in petroleum chemistry because petroleum is composed essentially of hydrocarbons. You probably know that it is convenient to represent hydrogen by H and carbon by C; these are known as symbols, and the simple hydrocarbons are composed of hydrogen and carbon.

All combinations of elementary substances take place in definite quantities and it happens that one part of carbon will unite with four of hydrogen to form the foundation member of the hydrocarbons. This is methane and is indicated by CH_4. Since carbon has the capacity to unite with four parts of hydrogen we speak of methane as a saturated compound, but if there were less than four hydrogen units with one of carbon, the substance would contain carbon that was not fully saturated; that is, it would be an unsaturated body.

A vast number of hydrocarbons are known which start from methane. These may be thought of as being made by dropping an H and adding the group CH_3 to each succeeding member, the second compound being C_2H_6, the third C_3H_8 and so on. As these advance it becomes easier to produce compounds which are short one or more hydrogens and such compounds are the unsaturated substances. The first one that may be reduced is C_2H_6. From this we may obtain either C_2H_4 or C_2H_2.

Petroleum and natural gas may be considered to be composed almost entirely of saturated hydrocarbons as unsaturated compounds are very seldom found in these products. The unsaturated hydrocarbons are produced by heat and pressure from the saturated substances, consequently they are present in the products from the ordinary cracking units.

When the unsaturated hydrocarbon is produced it is possible to introduce other elements, such as sulphur, chlorine, nitrogen and many others which are known as substitution products and these may then become saturated compounds.

METALS IN PETROLEUM

Can you furnish a list showing the different kinds of metals that are found in petroleum?—B. G. R.

While the quantity of mineral matter that is normal in petroleum is very small, there are numerous metals represented in the various petroleums of the world. Of course, the bit, other tools, etc., used for finding oil may introduce some metal into a hole, a part of which under favorable conditions could be combined with the oil. However, the wide distribution of some of the inorganic elements cannot be questioned. It is thought that they are combined with petroleum in the form of naphthenic salts.

The metals are found in the residue when the oil is reduced to an ash. The presence of vanadium has been noted in Pennsylvania, Mexican, Persian and other petroleums. Traces of gold, silver and uranium are frequently found. The ash of an oil from Patagonia has been reported to contain 0.2 per cent copper. Phosphorus and arsenic are additional elements found in petroleum in the Spindletop Pool. Iron, calcium, magnesium and aluminum are commonly found in many oils.

The Mexican oils contain a number of the metallic elements, such as iron, magnesium, aluminum, tin. lead, vanadium, titanium, cobalt, silver and gold. The presence of vanadium in so many oils, and in such comparatively large quantities, is worthy of note. An oil from Peru is said to produce an ash containing nearly 50 per cent vanadium.

The supposition that petroleum may have been formed from marine algae is supported by the composition of petroleum ash. It is known that marine algae have the power to absorb various elements from the sea-water, and the wide variety of mineral substances found in petroleum are also found in algae. The small percentage of phosphorous and nitrogen also suggests this possible origin of petroleum, because marine algae contain but very small quantities of these elements.

SULPHUR REMOVAL PROCESSES

Is it possible for you to give me a brief outline of the different processes that are used for removing sulphur from gas?—L. C.

Most of the processes now used for treating natural gas are based on methods which have been applied to the purification of manufactured gas. The best known processes are probably washing the gas with solutions of caustic soda or sodium carbonate. The use of sodium carbonate solution permits a regeneration of the solution with a current of air.

A solution of copper sulphate is used to convert the hydrogen sulphide to copper sulphide and the precipitate is oxidized to copper sulphate and sulphuric acid. This method suitable in sections where there is a ready market for the sulphuric acid. The recovery of free sulphur is in most cases more desirable and this may be accomplished by means of a solution of cupric chloride. The copper chloride is used in a warm solution of a strong brine; the final products being hydrochloric acid, sulphur and cuprous chloride. After the removal of the suspended sulphur, the solution, containing the cuprous chloride and the hydrochloric acid, is contacted with air to cause the formation of cupric chloride.

Iron in the form of ferric hydrate has been widely used for removal of hydrogen sulphide from artificial gas. The ferric hydrate being exposed to the gas on some inert material. The material after absorbing the sulphur is also reclaimed by blowing air through it. This process will yield free sulphur or sulphur dioxide, according to the quantity of air used and the temperature employed.

A process used in Germany for the treatment of artificial gas makes use of activated charcoal in the presence of small quantities of ammonia and air. The hydrogen sulphide is oxidized to sulphur and this in turn dissolved by a solution of ammonium sulphide.

Another process, which is receiving attention, is based on the reactions of hydrogen sulphide and sulphur dioxide, the products being sulphur and water.

There are several references in the literature to the use of catalysts for the conversion of organic sulphur compounds, and hydrogen sulphide. Among these are the passage of the gas through heated tubes in the presence of copper, lead, bismuth, silver, gold and a special mixture of copper, lead and chromium oxides. The organic sulphur compounds are changed to hydrogen sulphide and this may be removed by one of the processes above mentioned.

GRAVITY STANDARDS

Will you kindly explain what is the meaning of gravity as applied to oils and is there any standard for gravity? I see it stated as Baume, A.P.I. and specific and wonder which is the correct one?—T. S. C.

An explanation of gravity as applied to petroleum liquids may be found in the bulletin of the American Society for Testing Materials, "The Significance of Tests of Petroleum Products," page 2, as quoted in the material following:

"The gravity of a petroleum oil is a numerical value which is an index of the weight of a measured volume of the product. There are two scales in general use in the petroleum industry, the specific gravity scale and the A.P.I. gravity scale.

"The specific gravity of an oil is, according to the general custom of this country, the ratio of the weights of equal volumes of oil and water, both weights being determined with the liquid at a temperature of 60 degrees Fahrenheit (15.56 degrees Centigrade) and both weights being corrected for the buoyant effect of the air. The temperature limitations are indicated conveniently by the expression 'Specific gravity 60/60 degrees Fahrenheit.' An exception to this general rule exists in the case of petroleum products used as asphalts and road oils. For these products it is standard practice to use the temperature of 77 degrees Fahrenheit instead of 60 degrees Fahrenheit.

"The A.P.I. gravity of an oil is a mathematical function of the specific gravity, as defined above. The relationship is indicated by the following equation:

$$\text{Deg. A.P.I.} = \frac{141.5}{\text{sp. gr. } 60/60^\circ \text{ F.}} - 131.5$$

The figure 141.5 is termed the modulus of the A.P.I. scale.

"Specific gravity is generally used in Continental Europe and in many other countries. It is also in rather extensive use in the United States, especially when export business is involved. The A.P.I. (American Petroleum Institute) gravity scale is generally used in the United States. It was formerly known as the Baume scale, the name being changed to avoid confusion with the other Baume scales, particularly the one based upon a modulus of 140.0. The A.P.I. scale differs from this Baume scale by amounts ranging from one-tenth of 1 degree or less for heavy fuel oils up to seven or eight-tenths of 1 degree for natural gasoline.

"It is of importance to point out that European practice in reporting specific gravity differs from that of the United States. The custom in Europe is to report the ratio of the weights of equal volumes of oil and water, the former at a temperature of 15 degrees Centigrade (59 degrees Fahrenheit) and the latter at a temperature of 4 dgrees Centigrade (39.2 degrees Fahrenheit). The weights are not corrected for the buoyant effect of air. When specific gravities are reported according to this system, the weight of a specified volume is directly proportional to the specific gravity of the oil. When specific gravities are reported according to the system in use in the United States, calculation of the exact weight of a specified volume of oil is not so simple. This, however, is not a serious disadvantage, as the accurate and comprehensive tables, National Standard Petroleum Oil Tables, United States Bureau of Standards Circular No. 154, include figures for the weights per gallon of oils of different A.P.I. and specific gravities."

HYDROGENATION AND CRACKING

One of the new processes for making gasoline is described as a combination of cracking and hydrogenation and it would be a favor if you would explain what this means. Also what is active hydrogen?—G. L. Y.

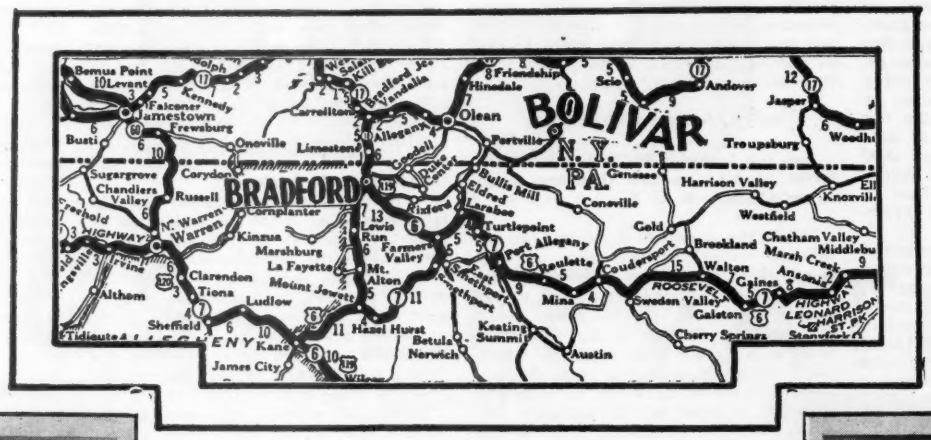
The explanation that the production of gasoline in the cracking process is accomplished by breaking apart the heavier, or longer chain hydrocarbon, is commonly accepted. When this is done there is an excess of carbon, which collects in the apparatus in the form of coke if the operation is carried to the limit; but an effort is always made to keep carbon formation at the minimum by stopping the process when the residue is a liquid. This results in curtailing the yield of gasoline. If it were possible to provide a supply of hydrogen, which could be made to combine with the carbon, there should be no coke formed and a much larger yield of gasoline should result.

Research work within the field of hydrogenation has been active for some years and several investigators have shown that hydrogen may be caused to combine with such substances as coal, tars, and other substances rich in carbon. The work with heavy petroleum products is of recent origin.

Simply providing a supply of hydrogen in the presence of the carbon compound will not accomplish the desired result. The chemist has demonstrated that elementary substances, such as hydrogen, do not exist in the atomic or single form but are in groups called molecules, a molecule of hydrogen being represented by H_2. The molecule does not always readily combine with another molecule. However, it has been found that the various elements will unite with more rapidity at the instant they are released from a compound and the theory is that at this stage the element is in the atomic form, which is called the nascent or active condition. Consequently active hydrogen is that form of the element which has not united with another part of hydrogen.

The conditions under which active hydrogen may be prepared require special methods which usually involve the use of a catalyst. One of the best known catalysts is very finely divided metallic nickel, but there are a large number of such substances used. Several forms of iron have been suggested for use in the hydrogenation of petroleum products.

BRADFORD and BOLIVAR



H. E. WAGNER
Store Manager
Bradford, Pa.

J. P. HOFFMAN
Store Manager
Bolivar, N. Y.

EVEN though the Bradford Field, in McKean County, Penna., Cattaraugus County, N. Y., is 54 years old, there are more active strings of cable tools at work on its 85000 acres than in any other like area in the world.

Peak production was reached in 1881, when a little more than 100000 barrels a day was produced. From then on the production steadily decreased to a point where many wells could not be operated at a profit.

At this time the Flood method of re-pressuring was accidentally discovered, and since the discovery of the Flood, some 20 years ago, the field has gradually increased its production until it is now producing over 18000 barrels a day. It is estimated that many years will be required to exhaust the recoverable oil possibilities of this field.

A near neighbor to the Bradford Field is the Allegheny Field at Bolivar, New York. This field, which is on a much smaller structure, has increased its production some 500 per cent under the flooding method, and activity here is comparable to that in the Bradford area.

The oil obtained from the above fields is a very high grade oil. The combined daily production of the two fields at the present time is about 25000 barrels per day.

FRICK-
SUPPLY CO
PITTSBURGH, PA.

Interesting Facts About F-R Stores

ALMOST any retail establishment has its choice between several legitimate policies. A Furniture store, for instance, can handle domestic rugs, printed linoleum and cheap suites, or it can handle imported rugs, inlaid linoleum and very fine pieces. It could even do both, combining two policies.

But as we see it, there is only one legitimate policy for the oil country supply store, and that policy is to handle Quality Products Only. If we can't represent the manufacturer who makes the best there is for any given purpose, we simply won't handle anything at all.

If you will glance over the list below, you will see the world's foremost manufacturers of dependable oil country equipment.

This equipment is sold through well managed stores from the Rocky Mountains to the Atlantic Coast, so that no man may dig a well, lay a pipe line or operate a refinery without finding F-R Stores at his service.

DONOVAN BOILER WORKS

Oil Country Boilers and Tanks

BEAUMONT IRON WORKS COMPANY
Dreadnaugh Rotary Drilling and Pumping Equipment

FRICK-REID SERVICE RUBBER BELTING
Our Own Specifications

JONES & LAUGHLIN STEEL CORPORATION
Tubular Goods, Seamless and Lapwelded

J. P. RATIGAN
"Sure Grip" Line of Pumping Equipment

NATIONAL TRANSIT PUMP & MACHINE COMPANY
Pumps and Pipe Line Equipment

WILLIAM POWELL COMPANY
Valves for the Oil Industry

AXELSON MACHINE COMPANY
Sucker Rods, Pull Rods, Working Barrels, Etc.

JOSEPH REID GAS ENGINE COMPANY
Two and Four Cycle Gas Engines, Pumping Powers, Refinery Equipment

JOHN A. ROEBLING'S SONS COMPANY
Wire Lines and Welding Wire

ROSSENDALE-REDDAWAY COMPANY
"Camel Hair" and Canvas Stitched Belting

WALWORTH COMPANY
Fittings and Valves for all Branches of the Oil Industry

WHITLOCK CORDAGE COMPANY
Manila Cordage, including Drilling Cables, Bull Ropes, Cat Lines, Etc.

CHALLENGE PUMPING EQUIPMENT

·REID
RPORATION

TULSA, OKLA.

Field Problems and Their Solution

EDITED BY THOMAS F. SMILEY

In order that men connected with the drilling, producing and transporting branches of the petroleum industry may procure quickly a solution of many problems confronting them from time to time in their work, The Oil and Gas Journal has arranged with leading engineers and other recognized authorities to answer questions submitted by readers of this publication pertaining to the work of drilling and producing crude oil and transporting this product.

Everyone is invited to submit questions freely. These questions will be submitted to proper authorities by Mr. Smiley, who edits the page, and answers, based on the best available information, will be published. Each question should give as much detail as possible, especially where it relates to matters where depths of sands, types of sands and operations on adjoining properties would have a bearing on the problem involved. The source of all questions will be considered as confidential and only initials will be published in connection with the question.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or practices which are improvements.

In case an immediate answer is important, one will be given by mail if the writer requests it.

REMOVE DRILLING DERRICK?

What is supposed to be the best practice with reference to the use of derricks, to remove the derrick used in drilling and put up another one or to leave the drilling derrick? In this territory we use wooden derricks almost entirely and we do not change derricks after completing the well. All drilling is with cable tools. What advantage is there in changing derricks?—D. S. T.

There are many conditions entering into the question as to whether it is better to leave a drilling derrick over a pumping well or cut it down and replace it with a shorter pumping derrick. The depth of the well has much to do with it.

If the wells are 3,000 feet deep or less the total time required to pull a string of rods and tubing to recondition the well is not great enough to make any material difference in labor costs and shutdown time, but where the wells are deeper than 3,000 feet these items enter into this problem.

The investment in a heavy drilling derrick is a considerable item not only in the structure itself but also in the concrete foundations that must be put in to support it and handle the heavy loads.

There is no practical way in which this first cost can be lowered materially and after this investment has been made and charged against that well, if it comes in a producer it is often better to permit the drilling derrick to remain over the hole for the flush production period and also for the time the well is produced by air or gas lift, for to make any change then might involve a shutdown in production that would cost more than the difference to be gained by salvaging the heavy derrick and replacing it with the lighter pumper.

Good practice seems to indicate that the most practical way to handle such a situation is to use a drilling derrick that is relegged; that is, supplied with reinforcing legs that fit inside the regular legs and give the derrick the added strength needed to permit it to be used for drilling.

After the well is in these relegs can be removed without much additional trouble and expense and salvaged and the lighter derrick still left over the hole for the pumping condition.

There is a cost to be charged against such operations of labor time for erecting and taking down the relegs and it has been found that it does not cost any more to add weight to the legs of the structure to give it the strength required for the drilling operations and then allow it to stand for the pumping period.

In pulling rods and tubing with an 84-foot derrick from a 4,000-foot hole it is estimated about 18 to 20 hours will be required for the round trip, and this time can be shortened to about 12 or 15 hours if the 122-foot derrick is used. This represents a material shortening of the shutdown time, or will permit the placing of the well back upon the beam with less loss of oil, and will offset any charge that may be set up on the books against the lease because of the more costly equipment being left there.

There is a final consideration to enter into this whole transaction and that is the advantage of having the heavy drilling derrick over the hole when it comes time to pull casing and abandon the well. If the light pumping derrick is over the hole then it must be reinforced in some way if the casing is to be pulled with safety, and the additional pipe recovered by using heavy equipment will often well repay the company for the money invested in the drilling derrick.

Furthermore by using only one type and size of derrick for both drilling and pumping operations the total investment in equipment can be held at a minimum and replacement parts carried for only one type of outfit.

Where wells cost in the neighborhood of $100,000 each, as a great many of the deeper wells are now doing, the difference in cost of the derrick structure is a small item as compared with the total, and the value of having adequately strong rigs for all purposes is recognized by producers who give such matters much thought. So it would seem that deep wells justify the use of heavy drilling derricks and leaving them for the pumping period, and shallow wells can also use the shorter derricks with which they were drilled equally well. There is not much call for the so-called pumping derricks. A.P.I. standardized specifications do not list any such derricks.

EARLY USE OF MAGNETOMETER

Can you tell me when the first geophysical work with the magnetometer was done in search of oil structures? Can you tell me please with what success the magnetometer has been used, and what fields have been discovered in Texas, Oklahoma, Kansas and New Mexico with this instrument?—H. B. C.

At the Boston meeting in August, 1928, of the American Institute of Mining and Metallurgical Engineers, D. C. Barton of Houston, Tex., gave the following compact account of the early use of the magnetometer in this country:

"In connection with the comments on the history of the modern use of the magnetometer in this country, it may be interesting to record that apparently the first Schmidt-Lloyd variometer brought to this country was imported in March, 1924, at the writer's instigation, by Mr. DeGolyer of the Rycade Oil Corp. and Amerada Petroleum Corp. Beginning with a survey of the Blue Ridge salt dome in late March or early May, 1924, the use of the magnetometer was tested out under the writer's direction on the salt domes of the Gulf Coast, on faults in eastern Kaufman and southeastern Hunt Counties, and at Thrall, and in the winter of 1924-25 was tested out under Sidney Power's direction on various types of structure in Oklahoma, Texas, and the Panhandle area. A test survey was made of the Nocona granite ridge in May, 1925, which showed definitely that the magnetic method had considerable power in mapping certain granite ridges. Torsion wire magnetometers made by the now defunct G.P.G. of Freiburg were imported during the summer of 1925 by the Rycade Oil Corp. and were put in use by the Rycade Oil Corp. and the Amerada Petroleum Corp. Our extensive tests of the salt domes indicated that although the presence of the salt dome was indicated in the results of the magnetic survey, the indication was too unreliable for practical use in competition with the torsion balance or seismic methods."

WHY WAS IT CALLED THAT?

SWIVEL NECK

This is a corruption of "swivel bushing," designating a forged steel connection used between rotary drilling hose and the top of the grief-stem. Its design permits the drill pipe to be rotated in the hole while the water is pumped into it to create circulation needed to remove cuttings as made.

Oil fields in the Mid-Continent and Gulf Coast areas have been discovered in recent years through geophysical surveys. In The Oil and Gas Journal of November 8, 1928, an article, "Geophysics Big Factor on Gulf Coast," gives a list of domes found with geophysical instruments in Texas and Louisiana. Only one out of the 64 recorded is credited to the magnetometer.

DRILLING LINE PRECAUTIONS

I was reading in your "Field Problems and their Solution" an article on lubricating wire lines, and in it you advise against the practice of using crude oil for this purpose. I have been doing this for several years without noticing any specially bad results, but I can see the reason for your saying it is not a good practice. I am making the kind of trough you describe for treating the line with heated oil. I hear a good deal of discussion about the way a wire line ought to be handled to get the best results from it and the longest life and I would like to have any information along this line that you can give me.—N. G. S.

An excellent list of precautions that should be observed in handling wire lines is given by the Alco Tool Co. and it seems to meet your request so well that it is given here:

Don't pull loops over the sides of the reel. Set your reel of rope on a shaft supported on blocks or jacks and pull the rope from under the reel, rotating the reel but keeping the line taut—this will prevent "dog-legs" and kinks.

Don't pull under sill or any edge as this will cause a cranky line and develop high or loose strands. Use 22-inch or larger tubing blocks.

Don't spool rope unless your crown pulley lines up with spooling flanges.

Don't be careless in tying the rope. Use a soft annealed iron wire about No. 16 gauge (.063-inch diameter) and place three tie wires of about five or six turns each on each side of the cut. Tie your rope securely so as not to loosen some of the strands—this care will prevent the largest part of high stranded lines.

Don't fail to take care in socketing your rope as many are spoiled in this process.

Don't use soft rope, wire or babbitt in setting sockets. Use only commercially pure zinc or spelter.

Don't slip a new line for the first 1,500 feet. Longer rope service will result if the line is broken in easier. Don't slip continuously after 1,500 feet; each time tools are pulled out, take up screw and let out at least half way. This will give slack collected in strands a chance to go back in place.

Don't pull square over edge of the clamps, if you intend to split the clamps.

Don't let tools get away and have to grab them with clamps so that smoke will be seen coming from the line. See that clamps and slips are in good order. If tools swing away, shut off the motion.

Don't forget to oil your rope thoroughly when you respool. You may lose your rope on the next well by having a rotted core if you don't. Don't use crude oil for lubrication.

Don't forget that a new crown block is cheaper than a new line or a fishing job. A worn down crown block with an undersize groove will pinch a new rope and spoil it in a few towers. Blocks with manganes steel sheaves are an economy—both in block expense and line expense.

Don't use four pieces of wood to keep spooling flanges in place as this develops "dog-legs," resulting in spot wear. Fill in solid and evenly between the dividers.

Don't use a swivel socket that has a habit of sticking.

Don't make your line reach too far by giving it more motion.

Don't tight hitch (only when absolutely necessary).

Don't flag through the center of the rope when swabbing (when flagging through rope for swabbing use smallest flag possible, so as not to open strands too far when putting in flag).

Don't drop bailer in hole without slowing down for fluid if any, as this will pop the sand line core and develop worn spots on the line as slack rubs the casing.

PERILS OF HYDROGEN SULPHIDE

Does the hydrogen sulphide gas which causes so much damage to oil-well equipment have any ill effects on workmen? Is there any way of detecting the presence of this gas so that the workmen may have some warning? If the gas does act as a poison on workmen, how does it affect them and is there any way of affording protection?—N. E. S.

Hydrogen sulphide gas, when breathed into the lungs, displaces the oxygen in the lungs, irritates the air passages and membranes, and if present in sufficient quantities suffocates the worker. It also irritates the eyes and causes "gas eyes" which are very painful and usually cause from two to five days' lost time. The presence of hydrogen sulphide gas is usually indicated by an odor similar to that of rotten eggs, but when present in large quantities it seems to paralyze the sense of smell and becomes unnoticeable, so the worker may be overcome without a realization of the danger. Gas masks should be used by workers who are required to work in hydrogen sulphide gas. The hose and blower type of mask only give full protection. The canister type of mask affords incomplete protection. Vapor-proof goggles are being used to some extent to prevent "gas eyes." Workers overcome by hydrogen sulphide gas should immediately be moved to fresh air and if possible revived by artificial respiration.

—with HYATTIZED equipment

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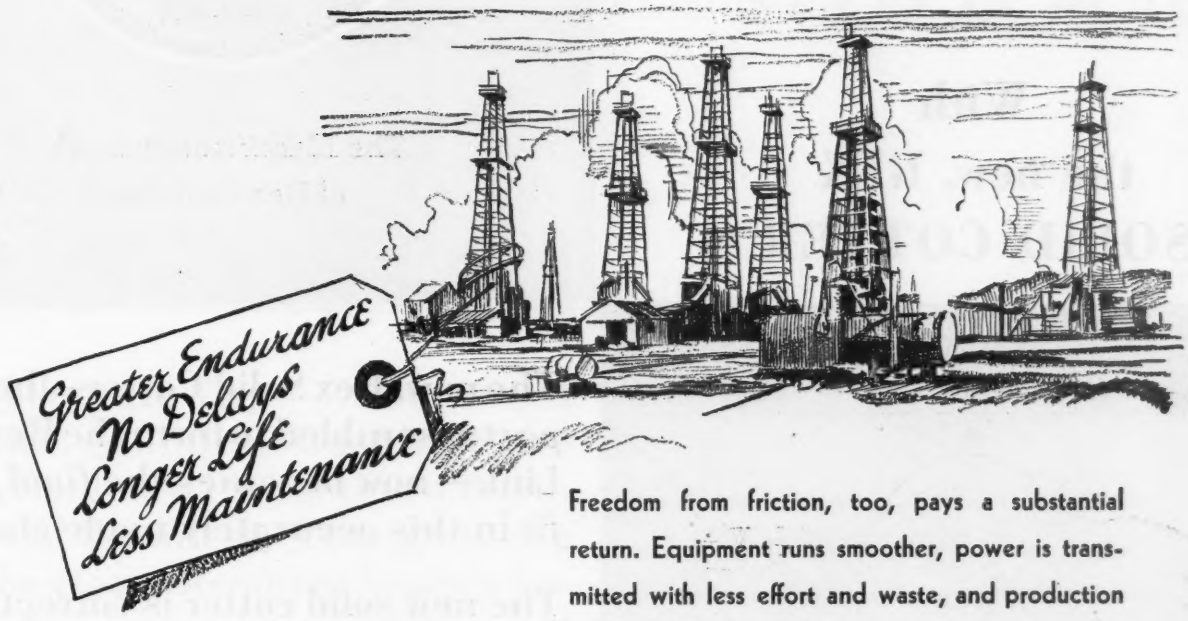
Saving because Hyatt bearings reduce attention, lubrications, breakdowns, time and labor losses. Saving because they stand up under the steady grind of severe operating demands, and prolong life as they serve.



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Extending the ACCURATE FORCE

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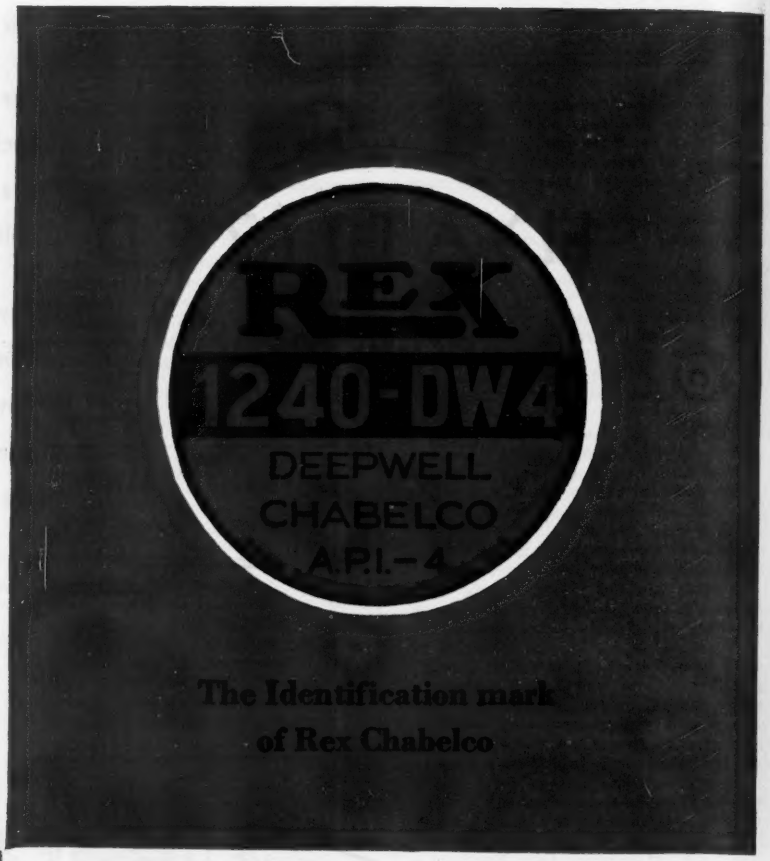
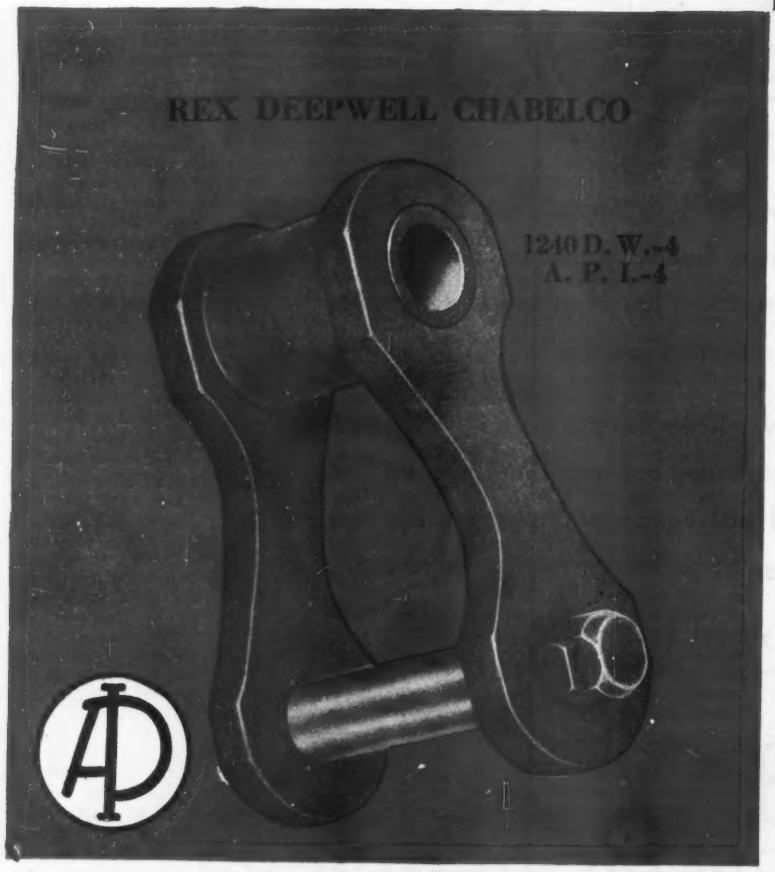


The Identification mark of Rex Chabelco

With the new, REX SOLID COTTER



The new, Rex Solid Cotter—the *final part* assembled to form the Rex Unit Link—now becomes the *final force-fit* in this accurately made chain.

The new solid cotter is correctly put in place by the slow, sure stroke of pressure recording machinery—it Cannot Rock; Cannot Break; and Stays in Place ALWAYS.

It fills up the pin hole *all the way through*, locking the pin securely and permanently into the sidebars.

It ends the trouble of flying cotters, and the inconvenience of riveted chain.

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CANNOT BREAK—
STAYS IN PLACE

The accurate force-fits between Ground, Seamless Bushings and Case-Hardened Pin; between Bushings and Seamless, Alloy Rollers—and the close tolerances in pitch between Sidebar working surfaces—all combine to give Strength, Hardness and Precision to the Unit Link that Stays a Unit.

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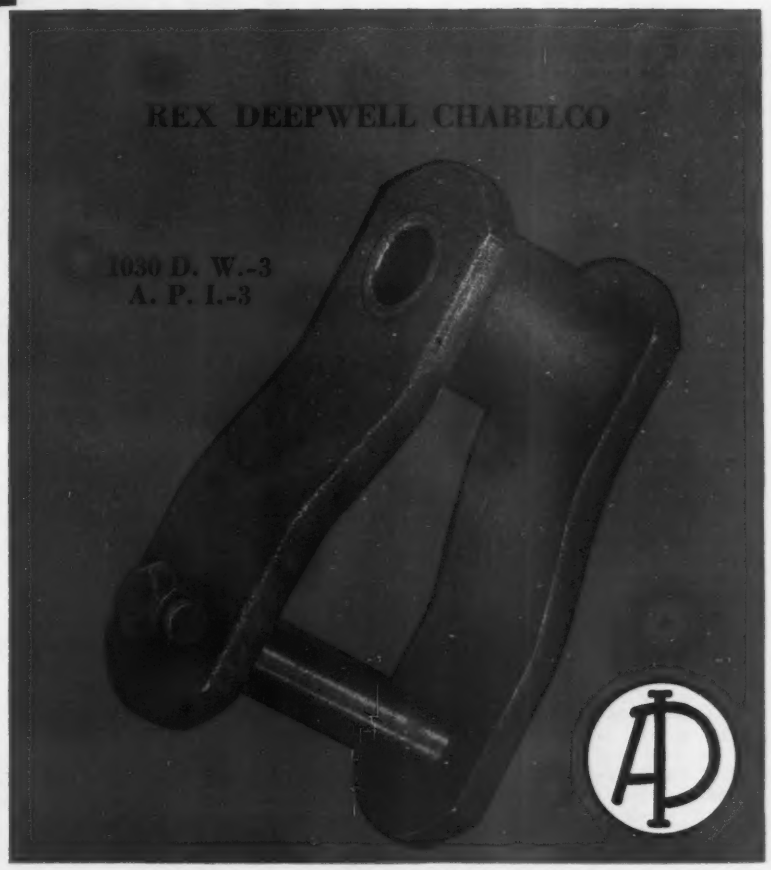

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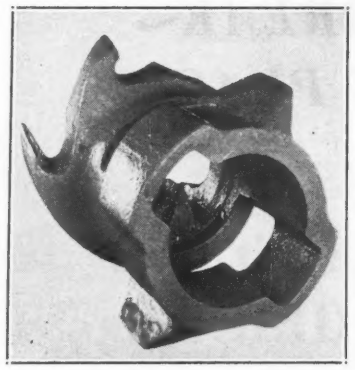
CHABELCO

The Greatest Chain that Ever Hit The Oil Fields

EQUIPMENT AND SUPPLIES

TYPE 5 WKW DRILLING BIT HAS NEW FEATURES

The Model 5 WKW bit, incorporating new features, has been put on the market by the Wieman-Kammerer-Wright Co., Inc., Hollydale, Calif. It cuts a core and then destroys it. There are six blades arranged around the circumference of the bit in such a manner that four of the teeth cut the outside gauge and the remaining two teeth cut an inner circle at the same level, to provide clearance for the outside teeth. In contacting the formation each tooth shaves off a slice, and a core of the formation is formed automatically. This core extends up within the bit sufficiently to act as a guide in



Model 5 WKW bit.

keeping the bit in a straight course through all sorts of formation. In addition to the six lowest teeth there are two inside teeth arranged across the center at a higher level which disposes of the core which has lost practically all of its resistance owing to its isolation from the rest of the formation.

The water course comes directly through the center of the shank, a full-size hole being drilled through the shank within 2½ inches of the opening. This remaining 2½ inches from the end of the shank is reduced to diameter of 1 inch to form a nozzle which adds to the velocity of the fluid. This short nozzle cannot become plugged. The fluid is directed to all cutting points and is forced out between the teeth, under pressure, carrying the cuttings up around the shank, thereby eliminating balling up of the bit.

The cutting shoe and method of attaching it to the shank are a new WKW feature. The shank of the bit is provided with a pair of lugs for engaging the slots in the shoe. When attaching the cutting shoe to the shank it is only necessary to slide the shoe on and give it a quarter turn so that the lugs will fit into the recesses. The two locking keys are then slipped into place and the set screw inserted to lock the keys.

The WKW cuts a round hole and reams as it digs. The cutting teeth are arranged so that lines drawn through each pair of the outermost blades will describe an X. By this arrangement the blades will not bind and a full gauge hole is assured. The reaming blades are so arranged that they are reaming the hole to gauge at all times. For this reason a fresh WKW bit can be run to the bottom of the hole without loss of time and wear on the blades in reaming the hole.

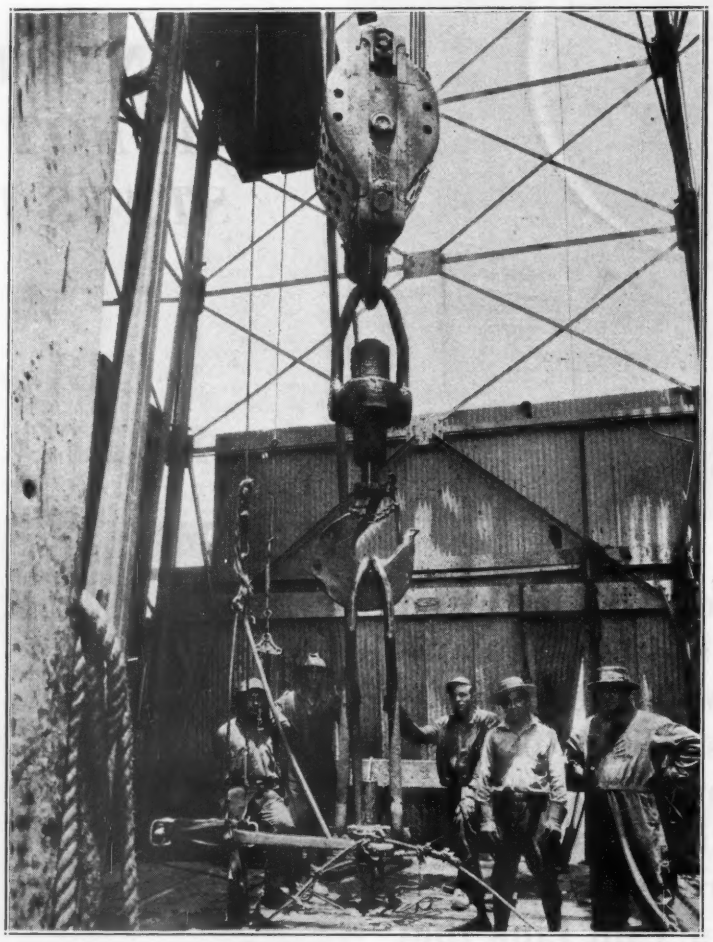
NEW ALLOY FOR HARD FACING

Type-T metal, manufactured by the Fusion Welding Corp., Chicago, is a new alloy furnished in the form of welding rod for applying a highly wear resistant surface by either the oxy-acetylene or metallic arc welding processes. Its development is the result of investigation into the theory of abrasion by the company's research department. Type-T metal is not only hard but possesses ductility which gives to it unusual properties. Drill bits faced with this metal are made highly resistant to wear.

REGAN BLOCKS USED IN DRILLING DEEPEST WELL, LONG BEACH FIELD

Breaking all records for deep drilling, No. 11 Nesa at Long Beach, Calif., is now being drilled beyond a depth of 9,300 feet. An eight-line stringup with a seven-sheave Regan crown block and four-sheave Regan traveling block is being used. The traveling block is the 62-inch size. Both the crown block and the traveling block previously had served other wells, drilling two to a depth of 6,500 feet each. Neither was special equipment.

Inspection of the traveling and crown blocks revealed that they were in good condition and could be used for a long period of time without replacement. The blocks embody the Regan antifriction bearings, one bearing being placed on each side of each sheave and the pin of each sheave being integral, rotating with its sheave. The same type of bearing is used in both blocks.



WITHSTAND INTENSE HEAT

Field men and refinery operatives should be interested in the new circular issued by the International Compositions Co., Inc., describing its No. 6 Rubshell paint recently developed to withstand temperatures up to 700 degrees Fahrenheit and intended for use on the inside of bubble towers and like apparatus exposed to the action of hydrogen sulphide gas. This paint is also recommended by the manufacturers for interior coating of steamers carrying sulphur crudes which are subjected to cleaning with live steam at frequent intervals. For interior coatings that are required to withstand temperatures of more than 700 degrees Fahrenheit the company offers "Volco," a new heat-proof paint that has withstood constant temperatures of over 1,200 degrees Fahrenheit for two years according to the manufacturers. The circulars can be obtained by addressing Rubshell Texas, Inc., Post Dispatch Building, Houston, Tex.; National Tank Steel Co., Alexander Building, Tulsa., and the International Compositions Co., Inc., 25 Broadway, New York.

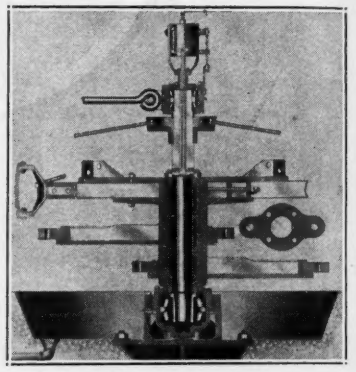
EXPORT AGENT FOR BREWSTER

The Brewster Co., Inc., of Shreveport, La., announces the W-K-M Co., of Houston and New York, as exclusive export agents for the Perfection core barrel, a product of the Brewster company. It is expected that the W-K-M Co. will soon carry the complete line of Brewster products which include core barrel cutter heads for both hard and soft formations; shoulder tool joints, drill collars, fishtail and special gumbo bits, and special rock bits.

DESIGNS NEW TYPE OF WELL PUMPING POWER

The Union Machine Co., Bartlesville, Okla., has developed a new type bandwheel pumping power which may be driven by either an internal combustion engine or electric motor of horsepowers up to 75 depending on the number of wells to be handled. Construction has been kept as simple as possible consistent with strength and rigidity.

The powers are of the revolving shaft, underpull type, the hubs of the bandwheel and eccentrics being firmly keyed to the shaft, and to each other to form a solid unit. The base is a heavy cast-iron plate having the lower bearing support cast integral with it. There is also



Timken-equipped bandwheel pumping power.

a vertical bracing and supporting member cast on the bottom of the brace. The bandwheel is of all-steel construction with channel steel spokes braced and supported by heavy tie rods which run to a circular plate the wheel hub. The spokes are wedged into the hub, and held in place by heavy stud bolts. The bandwheel rim is made of a rolled steel section, with a crowned face. This construction lightens the wheel without sacrificing strength.

The shaft is mounted in Timken bearings, the lower, or step bearing being of the type developed for railroad service, and having unusually high load carrying capacity. It is mounted in a self-aligning housing, to allow for possible misalignment when the power is installed. The outer support is split to facilitate assembly in the field. The closures are simple, but are designed to prevent any foreign material working its way into the bearing chamber. The guide, or top bearing, consists of two Timken bearings mounted to permit a certain amount of float. The brace rod used in lining up the bandwheel is attached directly to the housing of this bearing.

Lubrication of the step and guide bearings is by the pressure grease method, the housings in both cases being designed so that there is storage space for an ample reserve supply of lubricant. This feature, together with the tight closures used, eliminates the necessity for frequent renewals. The lubrication of the eccentrics is accomplished by a specially developed pressure oil system. Oil from the tank at the top of the shaft is forced through ducts in the shaft, and in the wheel and eccentric hubs, to the heels of the eccentrics. A small reservoir at the eccentric toe assures a continuous supply.

The new catalog issued by the Patterson-Ballagh Corp., Los Angeles, Calif., manufacturers of Bettis protectors, contains many pages of interesting information regarding the application of antifriction protectors to drill pipe and discusses the various drilling results obtained in practically all oil fields.

Foiling a Storage Tank at Humble, Texas

Foiling a Pipe Line in South Texas

Lowering Foiled Pipe Into Ditch

A Development of Major Importance to the Petroleum and Gas Industry

FOILING AND TECPRO

TECHNICAL PRODUCTS is proud of its contribution to this development for it was TecPro Foiling ADHESIVES which made possible the first successful cementing of Aluminum Foil to Metal and other surfaces.

Every known commercial application of Aluminum Foil has been made with TecPro and the word "Foiling" always suggests "TecPro".

Foiling was first conceived by engineers in their search for a protective covering for steel to check corrosion. Aluminum was known to be unaffected by most corrosive agents, but how to employ it successfully was the problem.

Pure 2SO coiled aluminum foil cemented with TecPro Foiling Adhesive was the answer, but, the checking of corrosion, while accomplished, was found to be only one of many benefits to be derived from Foiling.

Foiling is just like hanging wall paper, only easier, because no matching is required.

A FOILCLAD SURFACE keeps out the HEAT and MINIMIZES EVAPORATION:

Actual temperature tests by one of the major oil companies prove that the vapor space inside an 80,000-barrel storage tank, the roof of which is covered with aluminum foil, will be at least 10 degrees cooler during summer mid-day than a similar tank, the roof of which has been newly painted with the most reflective of paints. (Complete test data on request.)

A FOILED SURFACE IS PRACTICALLY PERMANENT. That is why many of the large oil and gas companies have already begun foiling storage tanks, pipe lines, tank cars, cooling towers and boxes, roofs and numerous other surfaces formerly temporarily and frequently protected with paint.

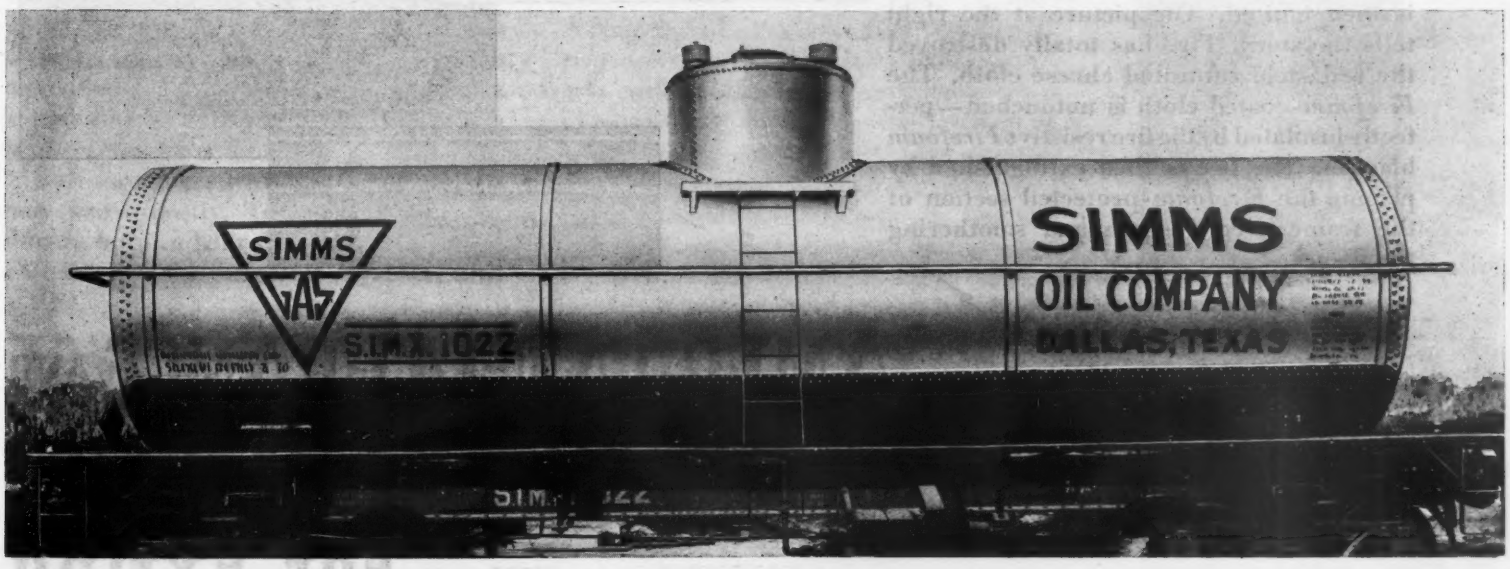
ALUMINUM FOIL IS WATERPROOF, THIN, LIGHT, VERY TOUGH AND SMOOTH. Therefore, if for no other reason, it is destined to become the foremost wrapping material for pipe line work. The best wrapped jobs call for an initial coat of Black Line 45 Cold Application Pipe Coating; a coat of TecPro Foiling Adhesive No. 1 and then wrapped with pure "2SO" aluminum foil.

Aluminum foil cemented with TecPro will prove a profitable investment because they solve one of the big problems of the oil industry.

The trade mark "TecPro" has long been familiar to the pipe line industry as TecPro BLACK LINE Pipe Coatings are known wherever quality is the first consideration in selecting underground metal protection. TecPro Foiling Adhesive will become even better known as "A Scientifically Conceived Product Designed for a Specific Purpose", a truism appearing on every TecPro label.

Write for folder giving additional detailed information regarding FOILING and TECPRO.

TECHNICAL PRODUCTS INCORPORATED
DALLAS, TEXAS



A "Foilclad" Tank Car

No oil fire the proper type of

No matter where fire may break out around your plant—no matter how serious the fire may be—there is a proven, *proper* type of FOAMITE Protection to kill it.

Every unit of FOAMITE Protection—from 2½-gallon FOAMITE Extinguishers to FOAMITE Two-Solution Systems which now guard 90,000,000 barrels of oil—has earned its place in your industry by proven performance in killing fires.

There has *never* been a failure to extinguish a tank fire where the FOAMITE Two-Solution System was designed, installed, and maintained by American-LaFrance and Foamite Engineers.

In refineries, bulk storage stations, around pipe lines, stills, etc., FOAMITE portable equipment has killed thousands of smaller fires while they were young.

FOAMITE Generators, and Generator Systems, have taken their place as a second line of defense to back up this smaller equipment in controlling fires.

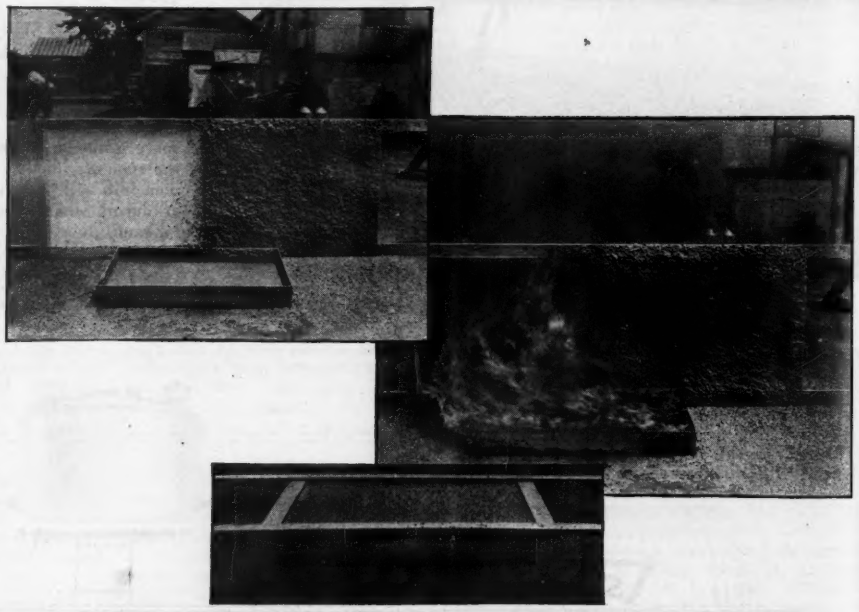
FOAMITE Equipment of *every* type has demonstrated, time after time, that it is the *highest* development of the foam fire-fighting principle.

Have you ever seen the "Cheese Cloth Test"?

The quality of *Firefoam*, produced by FOAMITE equipment, its ability to stick to burning surfaces, and its insulating and fire-proofing qualities, have never been better demonstrated than by this test.

The photograph at the left shows a double frame covered with a single strip of cheese cloth—one section covered with *Firefoam*—the other saturated with the discharge from an ordinary soda-acid extinguisher.

The pan of gasoline in front of this frame is then ignited. The picture at the right tells the story. Fire has totally destroyed the soda-acid saturated cheese cloth. The *Firefoam*-coated cloth is untouched—perfectly insulated by the fire resistive *Firefoam* blanket. The fire is then extinguished by placing the *Firefoam*-protected section of the frame over the pan and smothering the flames.



AMERICAN-LA FRANCE AND

A Complete Eng

For Exting

can ever defy FOAMITE equipment

FOAMITE Equipment for "first aid" attack

A quick attack with FOAMITE Extinguishers or Engines kills the smaller fires before they can spread. FOAMITE 2½ and 5-gallon Extinguishers, and 40-gallon Engines (made in two models—for indoor and outdoor use) are standard equipment today wherever oil operators insist on dependable protection.

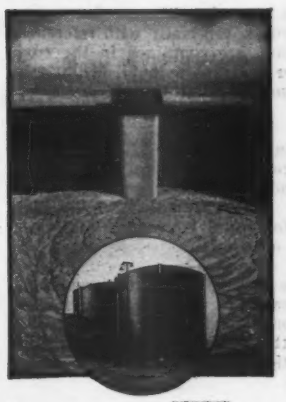
FOAMITE Foam Generators and Generator Systems

FOAMITE Generators need no fancy adjustments. Models 15 and 25 are easily portable—"million dollar performers that you can carry under your arm".

Like the Model 30, which is designed for permanent installation, they may be hooked into the FOAMITE Generator System for protecting any risk not justifying the expense of installing a standard FOAMITE Two-Solution System.

A single powder and a stream of water are all you need to produce practically unlimited quantities of genuine *Firefoam* with these Generators.

FOAMITE Two-Solution Systems



The application of *Firefoam* to the surface of burning oil, in adequate quantity and at the correct rate of flow, is not just a matter of pipes and pumps. It requires a system which co-ordinates many factors—and which will operate instantly, as a unit, in any fire crisis.

Half-way measures and experiments may prove costly. Today, most oil producers, here and abroad, depend upon the FOAMITE Two-Solution System, and American-La France and Foamite Engineers, for this vital protection.

American-La France and Foamite Representatives will gladly survey your property and recommend the proper types of equipment for complete protection. These representatives are located at points near all principal producing and refining centers. American-La France and Foamite Corporation, Engineers and Manufacturers, Dept. F-33, Elmira, N. Y.

FOAMITE PROTECTION

ineering Service

uishing Fires

EQUIPMENT AND SUPPLIES

ECLIPSE LUBRICATOR GAINING POPULARITY

The Eclipse force and sight-feed lubricator, manufactured by the Eclipse Lubricator Co., Inc., Wichita Falls, Tex., and distributed by various supply houses throughout the Mid-Continent Field for several months, is said to be gaining rapidly in popularity and number of sales.

After removing the reservoir cover by loosening four screws, the driving shaft can be removed by the simple operation of loosening two lock-nuts, one at each end of the shaft. The mechanism on the driving shaft can be removed then without the use of any tools.

The lubricator is constructed so that all parts excepting the driving shaft and reservoir are interchangeable from one size lubricator to another. The pumping unit can be taken out of a single feed reservoir and placed in any other size reservoir for operation, or vice versa. With the Eclipse lubricator it is necessary merely to lift out the driving shaft and reverse it in the reservoir to obtain either a right-hand or left-hand drive, as may be desired.

On account of the complete interchangeability of parts the Eclipse lubricator is widely recommended for standardization where lubricators are used in various kinds of service, thereby eliminating the necessity of carrying a large stock of repair parts. The lubricator is said to have shown its excellence in sturdy construction and the great pressure it will work against.

These lubricators are manufactured for either ratchet belt or motor drive and made in sizes from 1 to 20 feet with reservoirs divided into as many compartments as desired.

TRADE LITERATURE RECEIVED

"Power Plant and Oil Refinery Equipment" is the title of a new catalog issued by the Key Boiler Equipment Co., East St. Louis, Ill., and illustrating refinery fittings, tube-rolling tools, air motors, metal gaskets, joint-sealing compounds, etc. Pictures show actual installations of Key safety hand hole caps.

Practical hints for drivers of automobiles and trucks, especially with reference to lubrication, are contained in the current number of Graphite, published by the Joseph Dixon Crucible Co., Jersey City, N. J.

A bulletin issued by the Hills-McCanna Co., Chicago, says the life of your equipment depends on positive and automatic lubrication and it explains why Hills-McCanna force-feed lubricators maintain a constant oil pressure.

Fifty-five reasons for Bettis protection are enumerated in a new catalog issued by Patterson-Ballagh, Los Angeles, Calif., describing the Bettis casing protector and its application to anti-friction tool joints and collars.

"How Armco Ingot Iron Saves in the Oil Industry" is the title of an informative publication being mailed by the American Rolling Mill Co., Middletown, Ohio. It is the result of a study of the fight against corrosion.

Two new bulletins are being distributed by the Sullivan Machinery Co., Chicago, one on pneumatic clay spaders and the other on pneumatic concrete breakers. Both are in two colors, illustrated.

The Perfecto, Hy-Power and Radiant Cross gas burners are the subjects of an attractively printed book issued by the Sonner Burner Co., Winfield, Kans.

DIXON PRODUCT ADAPTED FOR USE IN OIL FIELDS

One of the products of the Joseph Dixon Crucible Co., Jersey City, N. J., that is particularly adapted for use in oil fields and refineries is Dixon's Graphite Seal.

This graphite sealing paste is insoluble

in hot or cold oils, gasoline and other petroleum products. It is recommended for use on screw thread, flange and gasket joints, valves, etc., of pipe lines carrying petroleum or its products.

PORTABLE ONE-HAND SAW ELECTRICALLY OPERATED

The Wodack Electric Tool Corp., Chicago, has placed on the market a lightweight (only 15 pounds), one-hand electric saw for cutting any board up to 2⅝ inches thick. Its compact construction is featured by a sawdust blower for perfect vision, convenient trigger switch, momentary contact, rip gauge to save marking board to be sawed and depth gauge easily adjusted by one wing nut.

This unit is built complete, ready to use. Accessories include 15-foot extension cord, 1-pound can of Wodack lubricant, grease gun, steel carrying case, adjustable depth gauge and rip gauge. The Wodack Model K saw is designed to suit the needs of carpenters, engineers and contractors. It also is used for crating, plant maintenance and repair work.

PIPE AUTOMATICALLY CENTERED BY GUIDES

A new threader which incorporates, among other improved construction features, universal guides that automatically center the pipe, has just been placed on the market by the Oster Manufacturing Co., Cleveland, Ohio.

This new tool, called the "Leader," threads and cuts pipe from 1 to 2-inch. It is asserted that the universal pipe guides, the radically different ratchet construction, a floating stud arrangement and fully adjustable dies make the new tool extremely easy to operate and unusually fast in threading and cutting operations. It is said that nipples up to 2-inch can be threaded with the same ease and speed of regular pipe.

The "Leader" is available in either of two types, No. 1, a plain tool without the ratchet device feature and No. 1-A with the ratchet construction. The manufacturer states that because the ratchet is built directly around the dies where the strain of the pull ordinarily comes, much less effort is required to cut the thread and that the same construction feature also permits more freedom of action when working close to the wall or other cramped quarters.

MANY AREAS VISITED BY AIR

Jack Ballagh, of the Patterson-Ballagh Corp., Los Angeles, Calif., has covered important oil fields during the last five weeks, using an airplane almost exclusively. His trip began with a visit to the Canadian fields, checking up the service of Bettis protectors. He visited the Wyoming fields en route. He flew from Canada to Portland, Ore., and returned to Los Angeles for three days and then went by air to Texas for two weeks. He returned to Los Angeles in late September, planning to fly to Tulsa to attend the exposition. He arranged for increasing distribution of Bettis protectors by operating stock warehouse facilities in several new fields.

VERTICAL BEARING RUNS SUBMERGED IN OIL BATH

A swing with a bearing running vertically but submerged in oil is offered by B. G. Goble, Tulsa. It has a rain and dustproof covering and a quantity gravity feed tank extending above the level of friction. This tank is airtight and

Figure 1.

creates a vacuum by screwing in a plug. The oil feeds out slowly. A sediment tank receives cuttings, heavy oil and other heavy substances that settle away from the bearing.

This swing also has novel features in its arms which are held up in merry-go-

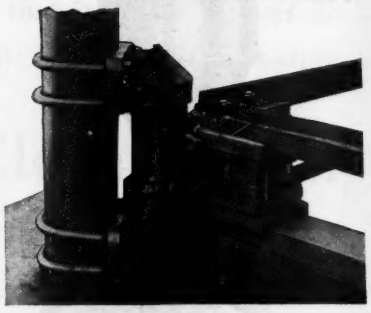


Figure 2.

round fashion. This allows for longer centers, giving an easier pull by keeping the swing from getting into foul positions on the expansion and contraction of long rod lines. Another advantage of the long

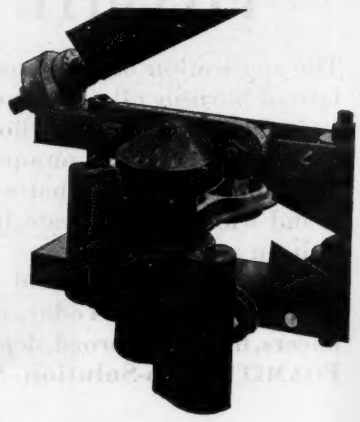


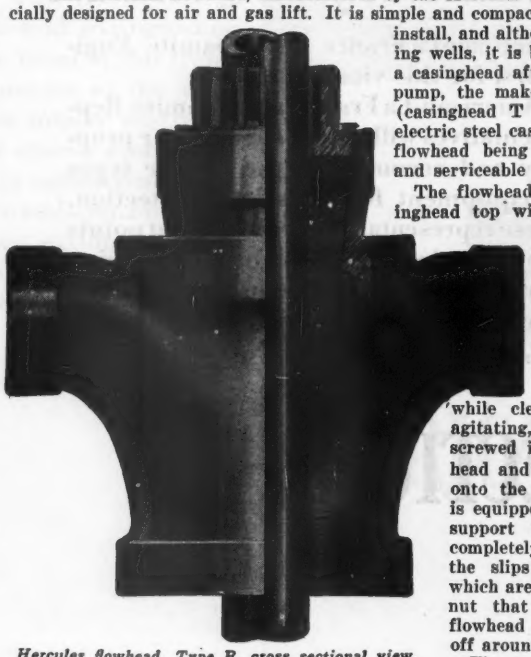
Figure 3.

center is that the bearings work only half as much and travel half as far as the shorter center. All the swing bearings run in a bath of oil with the quantity vacuum gravity feed and sediment basin.

Figure 1 shows the main bearing for the Globe pumping jack. It can be used also on a walking-beam. Figure 2 is the main bearing for the Goble swing. Figure 3 is a T-link bearing. Each runs in a bath of oil, is rain and dust-proof and has a sediment tank or basin to hold heavy substances away from the working part.

FLOWHEAD MADE ESPECIALLY FOR AIR AND GAS LIFT

The Hercules flowhead, manufactured by the Hercules Tool Co., Tulsa, was especially designed for air and gas lift. It is simple and compact, which makes it easy to install, and although constructed for flowing wells, it is being successfully used as a casinghead after the well is put on the pump, the makers point out. The body (casinghead T or Y type) is made of electric steel casting, which results in the flowhead being an exceptionally strong and serviceable device.



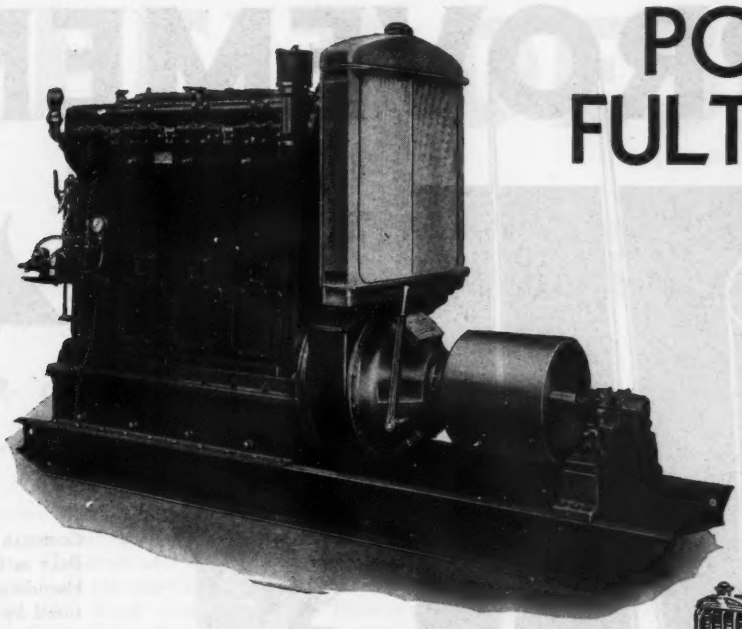
Hercules flowhead, Type B, cross sectional view.

The flowhead body has a regular casinghead top with set-screws so that in case it is desired to run tools into the well an oil-saver may be used. In order to do this, the top section (flowhead packing-bowl) must be unscrewed and removed from the flowhead body. If a control-head is used while cleaning out, swabbing or agitating, a short nipple can be screwed into the top of the flowhead and the control-head screwed onto the nipple. The top section is equipped with three slips which support the tubing by gripping completely around it. On top of the slips rest two packing-rings which are compressed by a packing-nut that screws down into the flowhead packing-bowl and packs off around the tubing.

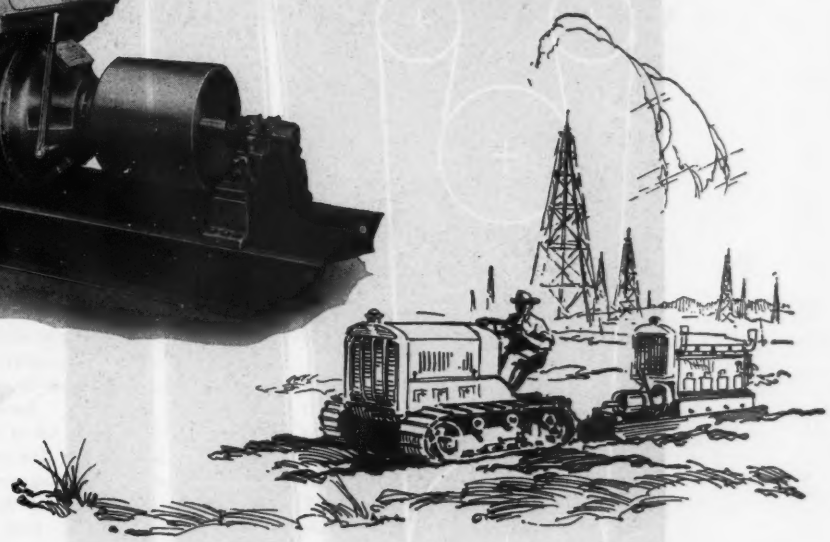
The type A, or Y-shaped flowhead, has a 2-inch outlet on the back side so that a pressure gauge may be attached. The type B, or T-shaped flowhead, has two 3-inch, 90-degree side curved outlets.

WHEREVER YOU NEED IT

PORTABLE FULTON-DIESEL UNIT



100 H. P. Portable FULTON-DIESEL Completely enclosed. Protected. Every part easily accessible.



The efficiency, accessibility and ease of operation of the FULTON-DIESEL as a portable power unit, has meant a remarkable Fulton acceptance in the oil fields.

The FULTON-DIESEL is sturdy, safe and economical—No fire hazard—Uses cheap fuel, economically—And has plenty of weight to do the job!

Let our engineers demonstrate the 'bull dog' capabilities of the FULTON-DIESEL best suited to your needs.

FULTON IRON WORKS CO. also produce grey-iron and semi-steel castings, rough or machined, 1 to 100,000 pounds.

FULTON IRON WORKS CO., ST. LOUIS

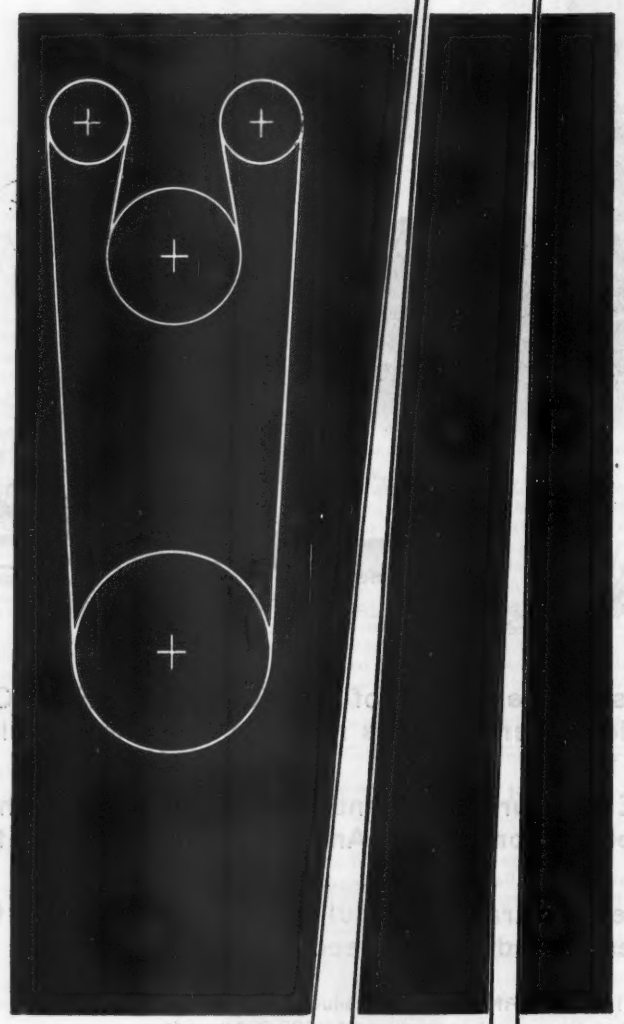
Successful Engine Builders for over Seventy-five Years

PLANTS: St. Louis, and Springfield, Ohio

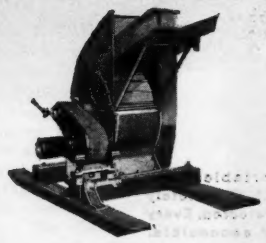
BRANCH OFFICES AND AGENTS: New York ' Chicago ' New Orleans ' Springfield, Ohio ' Tulsa ' Dallas ' Houston ' Boston Pittsburgh ' El Paso ' Mobile ' Salt Lake City ' Wichita, Kan. ' Havana

FULTON DIESEL

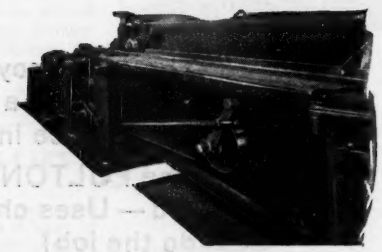
Here's the first major IMPROVEMENT



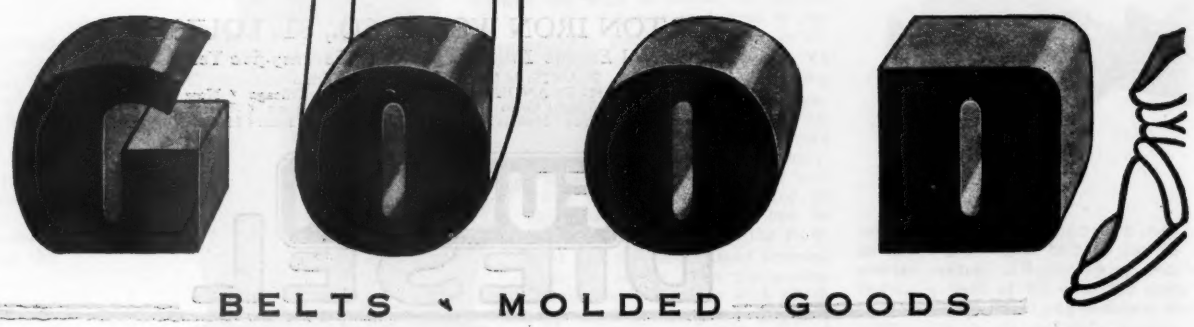
GOODYEAR ENDLESS COMPASS BELT in place on Papec Feed Grinder, manufactured by the Papec Machine Company, Shortsville, N. Y.



GOODYEAR ENDLESS COMPASS BELT in place on Jay Bee Humdinger Mill, manufactured by the Bossert Corporation, Utica, N. Y., and sold by J. B. Sedberry Inc., Utica, N. Y.



GOODYEAR ENDLESS COMPASS BELT in place on Woods hardwood flooring matcher in plant of E. L. Bruce Company, Memphis, Tenn.



BELTS • MOLDED GOODS

in BELT DESIGN in fifty years...

The New Goodyear Compass Belt . . . practically stretchless . . . genuinely endless . . . 25% thinner . . . with a core of rugged cord!

EVERYONE knows that high-speed transmission drives over small pulleys are belt killers. The acute arcs of contact, the extreme heats generated by speed and tension, soon break down even the best belts and send them flying to the scrap-heap.

Everyone who has had to do with the problems involved with rock drills, spinning frames, feed grinders, ice machines, and the belt-eating wood planer, knows the challenge of the high-speed small-contact drive.

Seeking a remedy, Goodyear engineers fifteen years ago turned their minds to the bold idea of a *new* belt—an indomitable belt—a belt with a core of *cord* instead of the traditional square-woven fabric. Then the vast resources of the Goodyear laboratories and technical staff were applied to a solution.

Now the fruits of this long endeavor are offered to industry in a new *cord transmission* belt, exhaustively tested and wholly approved, and accurately announced as *the first major improvement in transmission belts in 50 years.*

First, it is a *genuinely endless* transmission belt, and by principle of inlaid longitudinal cords, an *absolutely continuous belt.* There is no splice anywhere in its load-carrying core. The "weakest-link" failure of the older type of belt is thus eliminated.

Second, it is *the most nearly stretchless* transmission belt yet devised. Tensions for effective power transmission are once for all established in the cords when the belt is made. Thereafter stretch is minimal. Wear and loss of power from slippage are eliminated. Costly shut-downs are absent.

Third, it is the first *dual-function* transmission belt. Two vital belt functions—high resistance to wear and maximum power delivery—are here deliberately separated. Cords, laid side by side and impounded in rubber, carry the drive. A cross-woven, rubberized envelope enclosing the cords takes all the wear.

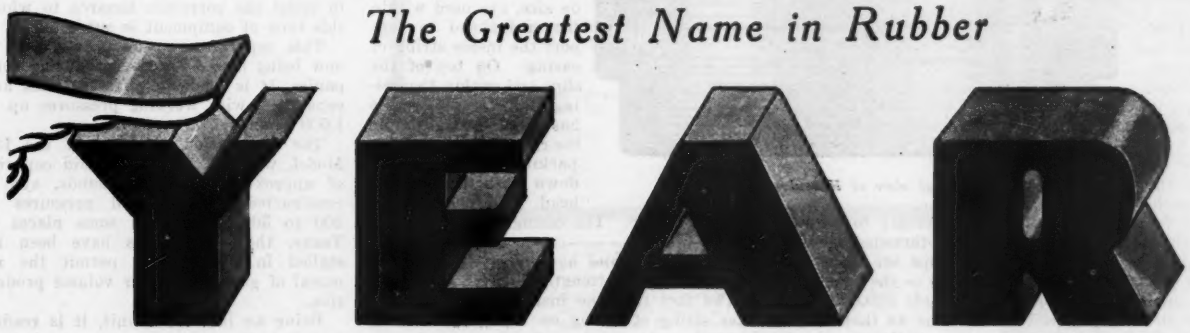
This new Goodyear Compass Belt is 25% thinner than other belts of equal power capacity and therefore more flexible. It conforms readily to small pulleys, is sufficiently elastic for shock loads, and is safeguarded from internal wear. Ply separation is unheard of.

Goodyear is proud of this new belt. It has reserved its announcement awaiting the convincing proof, now fully authenticated, from test belts spotted in key transmission drives throughout the country. The tests have been arduous. They prove the belt. It stands as the first major improvement in belt design in half a century.

The new belt is called the Goodyear Compass Endless Belt, and is designed for open end drives. Like all other Goodyear Mechanical Rubber Goods it is accurately applied to your needs by the G.T.M.—Goodyear Technical Man—an expertly designed belt, expertly fitted to your own endless belt drives.

For further information as to the superiorities of the Goodyear Compass Belt in your service, write to Goodyear, Akron, Ohio, or Los Angeles, Calif.

The Greatest Name in Rubber



Copyright 1929, by The Goodyear Tire & Rubber Co., Inc.

HOSE · PACKING

EQUIPMENT AND SUPPLIES

REGAN OFFERS A NEW SPRING CASING HOOK

An improved type of spring casing hook embodying time-proven principles and offering improved features has been developed by Regan Forge and Engineering Co., San Pedro, Calif., and the hook will be shown for the first time at the Tulsa Petroleum Exposition. It is made of alloy steel, heat-treated, with the hook bored out. Special attention has been given to the design of the hook, which has more cross-sectional area of metal and much greater weight to handle the heaviest loads.

For several months the experimental hooks of this design had been in operation in California used on the world's deepest well and several score of other deep wells, and has proven entirely satisfactory, according to the manufacturers and drillers.

LINCOLN ELECTRIC CO. PRESENTS NEW WELDER

The new improved Lincoln "Stable-arc" welders, manufactured by the Lincoln Electric Co., Cleveland, Ohio, are presented as the latest and most modern type of electric arc welding equipment.

The "Linc-Weld" motor and generator are built specifically for welding service and are not a general purpose motor and generator coupled for welding use. The generator is differently compounded, which means that the series field is in opposition to the shunt field. This is called a bucking series field. By means of a diverter switch, the amount of bucking effect may be varied independently of the open circuit voltage.

The generator frame, as well as the pole pieces, is entirely laminated. This feature of construction reduces the magnetic reluctance to a minimum and results in practically no delay to flux changes with respect to voltage changes in the arc. As voltage changes take place in the arc, the machine voltage also changes instantly, with no lag, and the result is a stable arc over the entire wide welding range of the machine.

A separately excited generator field maintains a constant field excitation in the welder, under all load conditions, even to a short circuit. Thus the field has the necessary current immediately after the arc is interrupted to re-establish the arc.

A properly designed stabilizer or reactor in the arc circuit smooths out the current variations, insuring a smooth, even flow of power. This is essential for high production welding of high quality.

Different work requires different combinations of voltage and current for successful and easy welding. With the dual control, the operator can vary open circuit voltage and welding current entirely independently of each other. This permits the use of stationary commutator brushes at the exact neutral point, insuring perfect commutation throughout the entire welding range.

The value of condensate in dollars and cents and how it can be conserved are told in an interesting booklet being sent out by the W. B. Connor Co., Inc., New York.

PROTECTORS TO COMBAT THE "RUB THAT RUINS"

The National casing protector, manufactured by National Tool & Metals, Inc., Torrance, Calif., is designed to combat the "rub that ruins" between the drill pipe and the casing (steel against steel).

Constructed with a steel core, set with steel dies and mounted with a high grade rubber sleeve, National protectors are recognized as a money saving device. The steel core is fastened with steel pins that hold it tight and compact against the pipe. The rubber sleeve keeps the drill pipe from wearing against the casing and greatly reduces the wear of the hosting equipment and the complete mechanism used to drill wells.

Drill pipe equipped with National protectors will last many times longer than drill pipe not thus equipped.

AXELSON MAKES PROMOTIONS

William H. Jackson, purchasing agent for the Axelson Machine Co., Los Angeles, Calif., and connected with that organization for 19 years, has been made special supervisor of the Axelson Aircraft Engine Co. and director of purchases for both concerns. Raymond E. Imhoff, assistant purchasing agent for the Axelson Machine Co., becomes purchasing agent with Leslie Salow as assistant.

OPENS CHICAGO OFFICE

The Marion Machine, Foundry & Supply Co. of Marion, Ind., has opened an office in Chicago in Room 1022, Insurance Center Building, 330 South Wells St. J. Mack Wilson, formerly sales managed, home division, is in charge of the Chicago office, and will sell the entire Marion line of boiler room specialties, metal buildings, clay working machinery, wood working machinery, etc.

NEW PRINCIPLES EMBODIED IN HERCULES CASINGHEAD

The Hercules casinghead, featured by the Hercules Tool Co., Tulsa, has slips for two strings of casing. It supports the inside string of pipe on slips using the Hercules method of packing off around the casing. With its new principles and positive grip slips, it is said to afford absolute casing protection and it permits the operator to raise or lower the casing at will by removing the packing nut, packing and slips. The casinghead can be repacked at any time without picking up casing.

Cross sectional view of Hercules casinghead.

The inside diameter of the casinghead is the same as that of the larger string of casing on which the casinghead is set up. Either three or four slips, depending on size, are used within the casinghead to support the inside string of casing. On top of the slips and within the casinghead, ample space has been provided for the rubber packing. This packing is compressed down into the casinghead, and chain tongs are the only tools necessary to connect the entire set-up. The casinghead is provided with two side outlets threaded for 3-inch pipe.

The body and slips are made of electric cast steel and have a safety factor of 2,500 pounds pressure to the square inch, with sufficient strength to carry a hanging weight of approximately 300,000 pounds. The fact that the inside diameter of the casinghead is the same as that of the larger string of casing on which the head is screwed allows the coupling on the inside string to pass through when running or pulling without interference.

To raise or lower the inside string of casing the workman unscrews the packing nut, removes the rubber packing and slips, then either raises or lowers the casing to the point desired, replaces the slips and packing rings and screws packing nut back into place. The use of the Hercules casinghead eliminates the necessity of using casing clamps, spiders and other equipment, with a great saving to the operator in cost of equipment.

The company also makes a forged steel casinghead with three rubber packing rings for extra high-pressure wells for a small additional cost. The packing nut is split (two halves) so that it can be removed at any time without lifting the casing. The casinghead is made for all standard sizes regular and A.P.I. casing.

PARKERSBURG'S DEVICE NAMED MIST EXTRACTOR

In series with the production line, the Parkersburg-Superior oil and gas separator or mist extractor, a new item of the Parkersburg line, provides the means of extracting dry gas for use or market. It takes the gas from the line and allows the oil to pass on its course to the tank. It also functions as a settling tank to separate water from the oil and remove sediment.

The gas man readily sees the possibilities of this separator for handling "drowned" gas wells. Water can be pumped through the device and the gas removed. The recovery is materially increased and the natural flow of the well is greater when the pressure is thus relieved.

The separator is simple and its operation entirely automatic. Because it relieves back pressure on the well, it is said to have increased production to some extent in numerous test installations. The line from the well, either flowing or pumping, is attached to the tangent-directed connection near the top of the separator. The fluid takes a whirling motion and passes down over a series of baffles, thoroughly breaking up the contents to release the gas which, without a separating device, too often is lost by evaporation later. The gas passes through perforations provided, and is carried out through the line at the top.

Sediment and water are drained off the bottom. The manhole at the side provides entrance for occasional inspection and cleaning.

The interior construction of the separator is of copper bearing steel. The valve is of brass, these materials being selected to resist the corrosion hazards to which this type of equipment is subjected.

This separator, or mist extractor, is now being used by major producing companies. It is made in different sizes and capacities, with working pressures up to 1,000 pounds maximum.

The illustration above is of the D-1 Model, which has a daily fluid capacity of approximately 5,000 pounds, and is constructed to withstand pressures of 200 to 300 pounds. In some places in Texas, these separators have been installed in batteries to permit the removal of gas from larger volume production.

Being an individual unit, it is readily installed in any arrangement desired. Many are used on the derrick floor, serving a single well.

The Houston office of the Chain Belt Co., Milwaukee, Wis., manufacturer of Rex Deep Well oil chains, conveyors and concrete mixers, has moved to larger quarters at 1310 Second National Bank Building. It formerly was located in the Marine Bank Building. Russell G. Davis is manager.

"-the fastest drilling article I have ever run in a rotary hole-"

says one

OKLAHOMA DRILLING CONTRACTOR

H. C. Smith Type 'C" Demountable Drilling Bit

OKLAHOMA has already put her stamp of approval on this H. C. Smith Type "C" Bit. It's a fast digging tool in any formation, and that's what Oklahoma drillers want.

The Type "C" is a new H. C. Smith *drop forged* demountable bit, embodying new features of construction which develop higher efficiency in rotary drilling.

If you have not received all the data on this new Smith bit, give us the word now and get it.

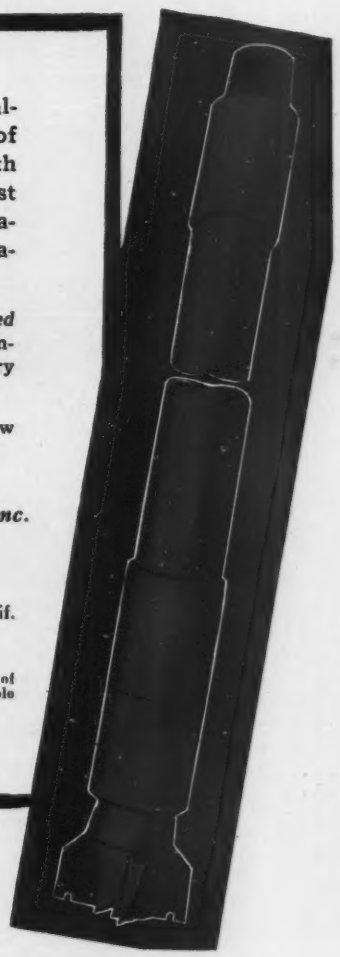
H. C. SMITH MANUFACTURING CO., *Inc.*
Los Nietos, California

Branch Offices and Warehouses:

Bakersfield, Calif. Ventura, Calif.

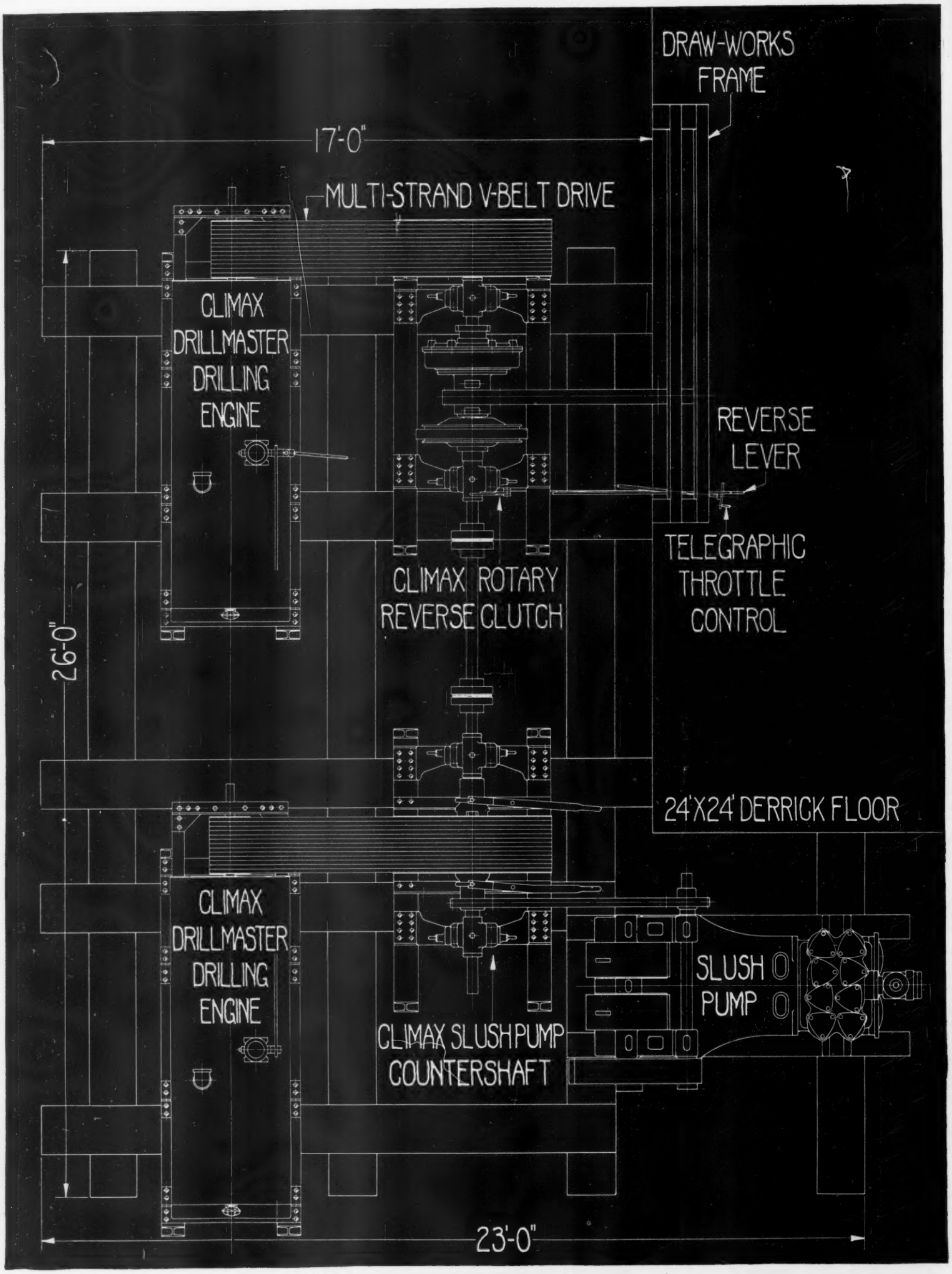
Cable Address: "Smithco, Whittier"

Oil Well Supply Co., Exclusive Sales Distributors, Outside of California for H. C. Smith Coring Equipment and Demountable Drilling Bits.



The H. C. Smith Type "C" Coring Outfit.

An old reliable standby in all fields—known wherever oil wells are cored—preferred because it can be depended upon to bring up a good core of any formation from any depth. Ask us about this one, too.


DRAW-WORKS FRAME
17'-0"
MULTI-STRAND V-BELT DRIVE
CLIMAX DRILLMASTER DRILLING ENGINE
REVERSE LEVER
TELEGRAPHIC THROTTLE CONTROL
CLIMAX ROTARY REVERSE CLUTCH
26'-0"
24'X24' DERRICK FLOOR
CLIMAX DRILLMASTER DRILLING ENGINE
SLUSH PUMP
CLIMAX SLUSH PUMP COUNTERSHAFT
23'-0"

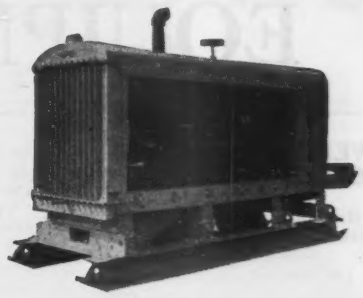
SAVINGS

FUEL - - - $469.00
LABOR - 905.00
WATER - 135.00

and a New Climax Rotary Hook-Up with the New Climax Drillmaster Engines

By powering their rotary rig with Climax engines on their Yates Well No. 1 southeast of Comanche, Okla., the Ellis Drilling Company made the savings listed above as compared with steam. And the drilling was especially tough due to extensive quartz and granite wash formation. The drawing gives you the ideal rotary hook-up powered with the new 150 h. p. Climax Drillmaster engines. Through the connecting shaft, two engines can be thrown to the draw works for reserve power and speed in pulling stem. This hook-up provides steam power flexibility. It gives you savings similar to those you see above. Write for full information on this new Drillmaster rotary outfit.

The Climax Drillmaster



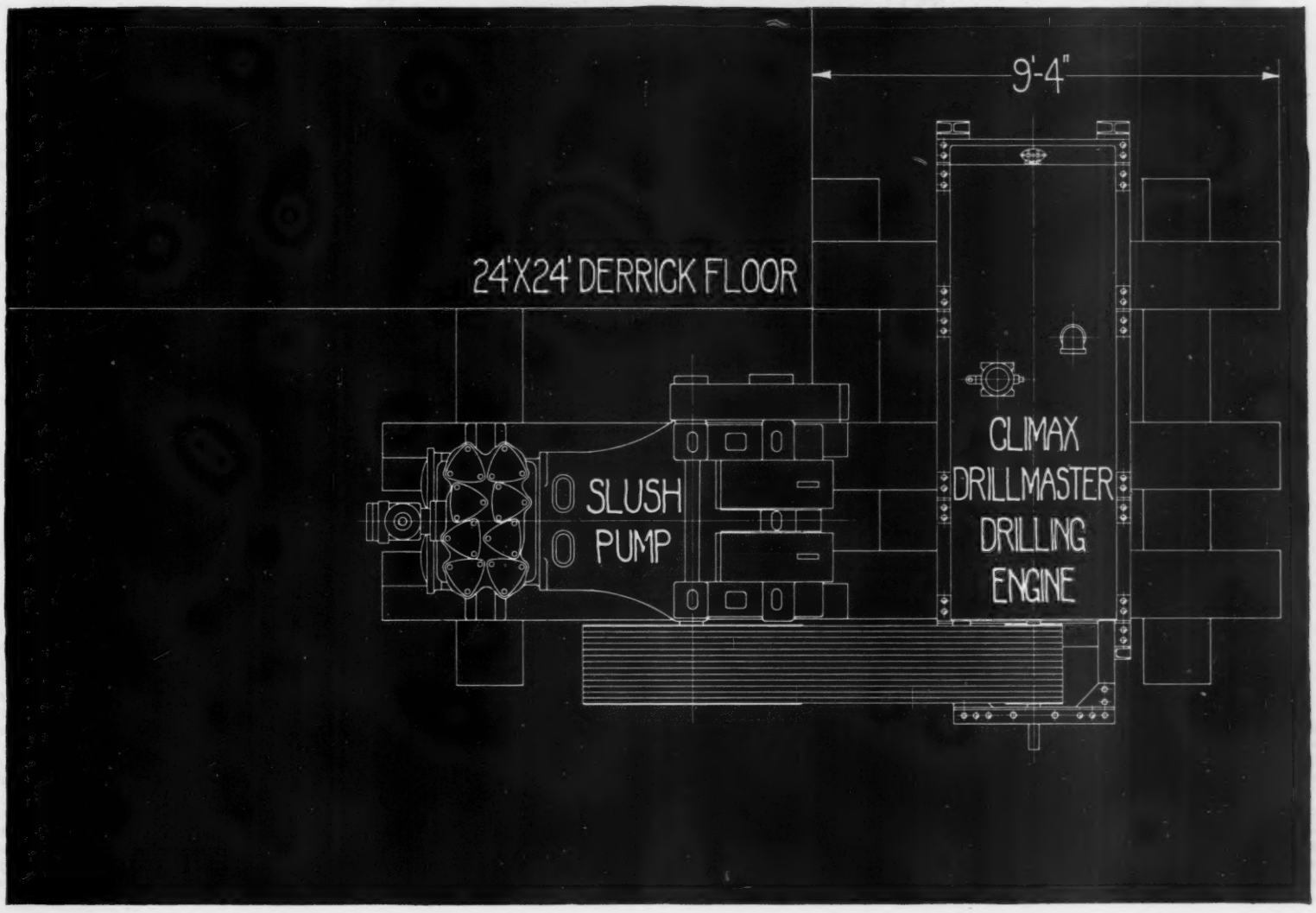
The Climax Drillmaster Engine is new from the skids up. It gives you lots of power—Valve-in-head design—Large Fan and Radiator whips bad water conditions—Large Water Passages that protect the valves—Diaphragm Fuel Pump and new Gas Mixing Valve for either Gasoline or Natural Gas—Self-aligning, Anti-friction Out-board Bearings that eliminate strain—Electric Starter and Generator—Air Cleaner and Carburetor—18-inch Single Plate Clutch—a dozen or more advantages that are provided to cut out needless operating expense.

CLIMAX Trade Mark Reg. U.S. Pat. Office

DISTRIBUTED BY THE NATIONAL SUPPLY COMPANIES

CLIMAX ENGINEERING COMPANY

76 WEST 18th AVENUE **CLINTON, IOWA**

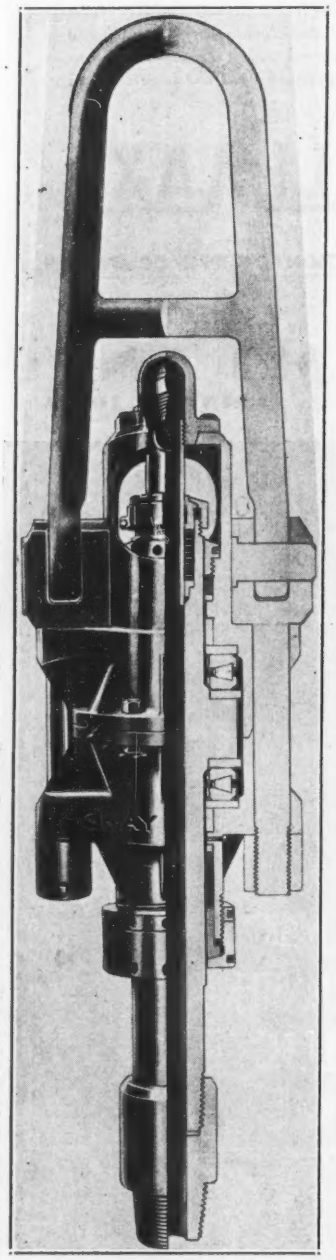


EQUIPMENT AND SUPPLIES

OIL-WELL SWIVEL MADE FOR HEAVY-DUTY WORK

The Gray Tool Co. of Houston, Tex., has introduced a new Timken-equipped oil well swivel incorporating novel features. The new swivel is especially suitable for heavy duty service, and emphasis has been placed on strength and simplicity in assembly.

One of the interesting features of the swivel is the method of suspension. This consists of a ball which, instead of being fastened over gudgeons, is bolted to the tops of two heavy bolts which extend the length of the swivel body. The bolts are carried with lugs, and are held at the bottom by heavy screw caps. The bail



proper is braced by a transverse member, which prevents pulling together and permits lighter construction of the bail itself without reducing strength.

This method of support has several advantages. It permits lifting the load through a straight pull on the bail bolts and from the bottom, eliminating tendency toward distortion or pulling together of main swivel body and avoiding the cramping of working parts. Further, the load on the bearing is equalized, saving wear on parts, and prolonging the life of the apparatus.

The rotating member is carried on two Timken thrust bearings, one above and one below shoulder on swivel stem. By virture of this construction ease of rotation is gained, as well as sufficient strength to withstand the shock loads encountered during spudding, and the use of blocks to obtain additional weight on the bit when rock is encountered near the surface is permitted and provided for.

Alemite system of lubrication is employed and sufficient space is left in the bearing housing to serve as a reservoir permitting oil bath for all working parts. Lower oil bath packing gland and wash pipe gland can be packed without the inconvenience of inserting packing through threads. The gooseneck is attached with bolts instead of studs. Each part is so designed to assure that the heaviest drill pipe will pull in two before any distortion occurs.

A new Linde oxygen plant in Erie, Pa., has commenced operations. This plant will supply the local demand for oxygen, widely used for oxy-acetylene welding and cutting. J. J. McKeen is superintendent of the plant.

AMERICAN CHAIN CO. MOVES

The Chicago offices of the American Chain Co., Inc., and associate companies have been moved to new quarters on the seventeenth floor of the Chicago Daily News Building. This step by the American Chain Co., which makes Weed chains, a complete line of welded and weldless chain and many other specialties, further centralizes the Chicago offices of several of the companies associated with it. The associate companies affected include Ford Chain Block Co., Highland Iron & Steel Co., The Manley Manufacturing Co., Page Steel & Wire Co., Reading Steel Casting Co. and Wright Manufacturing Co.

TRADE LITERATURE RECEIVED

Bristol's recording psychrometers are described in a 16-page booklet prepared by the Bristol Co., Waterbury, Conn.

A chart of carbon control for May, 1929, published in "Sivyer Reports" for September by the Sivyer Steel Casting Co., Milwaukee, Wis., indicates the close limits established by Sivyer's laboratory control.

PROGRESS IN INDUSTRY IS DEPENDENT ON RESEARCH

Front row, left to right: W. S. McLay, A. D. MacLean, L. M. Vander Pyle, N. J. Seibert, J. F. Reed, H. C. Chrisman, A. Schawalder, and E. W. Wright, Jr. Next row: A. F. Moore, H. Behtold, W. H. Parker, C. B. Johnson, R. E. Evarts, F. Neissmann, C. L. Bronner, and E. M. Kreidler. Top row: A. Duff, H. F. Bertl, A. C. Howe, C. E. Farrier, A. R. Moore, J. T. Madison, J. A. Mrosco, and E. J. Middlemiss.

The Pittsburgh Equitable Meter Co., Pittsburgh, Pa., believes that progress in industry is wholly dependent on research. Improvements in design and performance must not be left to chance nor to the whim of some inquisitive mind, but must result in the definite and planned schedule of development. Close contact with the industry for which the equipment is built is an invaluable asset to the engineering department, and to this end the Pittsburgh Equitable Meter Co. has made every effort to have its engineers contact with the engineers of the industry to which their equipment is sold.

The divisions of the Pittsburgh Equitable engineering department consist of those engineers employed primarily on test work both in the laboratory and fields; others whose function is using the data and information acquired by the engineers in the laboratory; members of the department primarily engaged in making production drawings and furnishing the shop with necessary information for building the product; another group whose duties are designing the necessary tools and equipment required to insure absolute interchangeability and the best and most economical methods. The department is so organized that the constant contact of all these groups of engineers is obtained, and the improvement of existing products or the development of new products results from their close co-operation.

The sales and service forces which the company sends out in the field, have been trained in the engineering and manufacturing departments, and are thus familiar with factory problems as well as field problems, and can be of greater service to the customer.

The personnel of the engineering department through several years' development has reached the stage where specialists in every line of the company's manufacture have been developed. Careful selecting and training have resulted in an organization which welcomes any problem identified with the industries it serves.

GENERAL ELECTRIC HAS NEW PORTABLE WELDER

A new portable electric arc welding machine announced by the General Electric Co. is driven by a six-cylinder gas engine, and replaces the four-cylinder engine-driven unit previously included in that company's line. Advantages of the six-cylinder engine are ease of starting, steadiness of operation and greater capacity. The generator bears the designation WD-300-A.

The new engine is the Buda model HS-6 power unit built especially for industrial service. The cylinder head is a four-cycle L-type. The bore is 3⅜ inches and the stroke 4½ inches. The S.A.E. horsepower rating is 27.3 and the actual brake horsepower is 39 at 1,440 revolutions per minute. The engine is totally enclosed in a sheet-metal housing. Gasoline consumption averages 2.4 gallons an hour for average welding duty at full normal-rated load.

The engine is equipped with a radiator of strong construction, centrifugal water pump, United centrifugal-type air cleaner, Eisemann high-tension magneto with impulse starter coupling, gravity-fed Zenith carburetor with choke control, speed-regulating governor, gas tank of 10 gallons capacity, starting crank, oil gauge and oil-pressure gauge.

The welding generator is a ball-bearing, self-excited, single-operator machine rated 300 amperes, one hour, 50 degrees Centigrade, with a current range of 90 to 375 amperes in accordance with N.E.M.A. standards. Included with the set is a current-reducing resistor by means of which welding currents down to 25 amperes may be obtained.

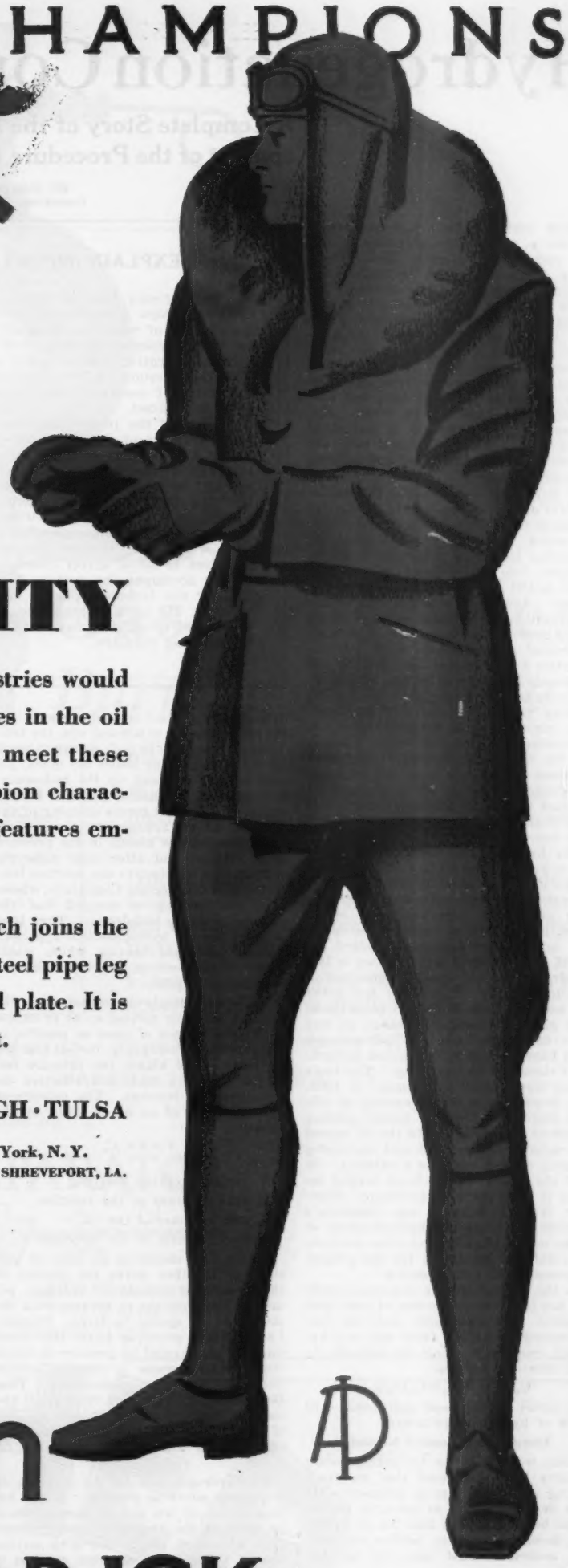
LUCAS BROS. OPEN FACTORY

The Lucas Brothers, owners of the Southwest Welding & Manufacturing Co., have completed their new eight-acre plant in Alhambra, Calif. When welding was in its infancy, Andrew Lucas founded the Southwest Welding & Manufacturing Co. His brother, John W. Lucas, is now vice president and general manager of the company. Both men have many friends in the oil industry. They maintain a fleet

Lucas Brothers

of trucks fully equipped with portable field electric welding apparatus and when an emergency call comes from the field they make it a point to have their equipment on the job and working, within a few hours. This unusual service was so appreciated by the industry that the Lucas Brothers enlarged their organization and became manufacturers. They rapidly outgrew their former plant and are today located in a modern, completely equipped new factory of their own where they are giving a complete service in piping and pipe bends, refinery equipment, tanks and general plate work. They are also manufacturing in large quantities the Lucas expansion joints.

AMONG CHAMPIONS



DEPENDABILITY

Oil men know that demands, which in other industries would be called emergencies, are commonplace occurences in the oil country. You can rely on the Moore Derrick to meet these widely varying demands. That is one of its Champion characteristics. Such dependability is the result of many features embodied in the Moore Champion.

One of these features is the new Moore Clamp which joins the structural steel girts and braces with the seamless steel pipe leg sections. This clamp has a solid body of rolled steel plate. It is convenient to use and makes a highly efficient joint.

LEE C. MOORE AND COMPANY, INC., PITTSBURGH · TULSA
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Stocks in All Principal Fields

THE Moore Champion DERRICK

Hydrogenation Commercially Applied

A Complete Story of the Early Work and the Development of the Procedure to Date. New Installations

By George A. Burrell
Consulting Chemical Engineer

EXPLAIN IMPORTANT DEVELOPMENT

The refining industry was surprised recently when the Standard Oil Co. of New Jersey announced that it had completed plans for the installation of what is commonly known as the "hydrogenation process." The process operating with heavy ends obtained in the present refining operation secures a 100 per cent recovery of motor fuel from a barrel of crude oil. The decision to build the commercial units was the result of research work in which the possibilities of the process were determined.

Units of the process are now under construction at the Bayway, N. J., refinery of the Standard Oil Co. of New Jersey and the Baton Rouge, La., refinery of the Standard Oil Co. of Louisiana, a subsidiary company. It has also been announced that an installation of the process will be made at the Baytown, Tex., refinery of the Humble Oil & Refining Co., another subsidiary company. The expenditure for the construction of these units, it is said, will exceed $15,000,000.

Since the announcement of the New Jersey Standard there has been widespread interest in the manufacturing development which promises to be of direct concern to all branches of the oil industry. In the accompanying article, Doctor Burrell removes the mystery regarding the technical phases of the process as applied to petroleum refining. He also explains the application of hydrogenation in other industries which has furnished the background for its utilization in the refining industry.

Much work has been done to convert the heavy unsaturated molecules in oil, coal and tars into motor fuel. These heavy products are rich in carbon and low in hydrogen. Adding hydrogen reverses this order and a motor fuel of saturated nature is produced. Coke and tars need be formed only in small or negligible amount. The unsaturated substances are responsible, in considerable measure at least, for odor, color and gumming properties in motor fuel, and consequently for high refining costs. Hydrogenating them produces a saturated motor fuel in which color and odor are improved, gum is diminished and refining costs are decreased.

It is possible, according to the Standard Oil Co. of New Jersey, to convert residuum from ordinary cracking processes, which is a heavy polymerized oil consisting largely of unsaturated hydrocarbons, into an amount of gasoline equal to 100 per cent (by volume) of the charge. Another interesting and important result is that sulphur in the oil passes off as hydrogen sulphide.

Krauch[1] states that the I. G. Farbenindustrie has converted coal tar, by hydrogenation into gasoline, the latter representing 90 per cent of the tar, and depending upon the catalysts employed, have made gasoline, kerosene, gas oils, lubricating oils, etc., at will. Thus it will be noted that hydrogenation work possesses a lure both from the academic and commercial sides, which accounts for the vast amount of laboratory work, and considerable commercial work, that has been done on the matter.

The hydrogenation of mineral oil has not as yet assumed a place of importance in the petroleum industry despite a large amount of experimental work that has been performed, particularly in recent years, but at least one plant is in operation in Germany and the Standard Oil Co. of New Jersey is building two in this country. However, the hydrogenation of fats to make edible products and soaps has assumed large industrial importance. Fish oils, cottonseed oil, peanut oil and other unsaturated oils are hydrogenated. Well known edible hydrogenated products are Crisco and Cream Crisp. The basic patent was granted to Norman,[2] in 1903, who described the hydrogenation of oils in a liquid condition, by merely passing a current of hydrogen into the oil heated to a suitable temperature, and containing a finely divided metal as a catalyst. In 1913 the patent was declared invalid because of inadequacy of disclosure. However, it was Sabatier and Senderen's classical work on the hydrogenation of oils by means of nickel and other catalysts that laid the foundation for the present processes of oil hydrogenation.[3]

In the fat industry an important problem has been the conversion of oleic acid or olein to stearic acid and the corresponding glyceride. Oleic acid and hydrogen combine, molecule for molecule, to yield stearic acid, thus:

$$C_{18}H_{34}O_2+H_2=C_{18}H_{36}O_2$$

One pound of oleic acid only needs 0.10 ounce of hydrogen equivalent.

Temperature Control Needed

Many workers in the fat-hydrogenation industry have discovered that an exact control of temperature is necessary. It must be high enough to speed up the reaction but not so high that the oil undergoes decomposition, i.e., neither the original molecules must split or the hydrogenated product dehydrogenate. In the hydrogenation of mineral oils, the temperature must not be high enough to break up the hydrogenated bodies too much, yet high enough to speed up the hydrogenation reaction as much as possible. British patent No. 311,759 covers stopping of the reaction at an appropriate time. Coal and hydrogen are heated in the presence of a catalyst and after some time the temperature is raised to the reaction temperature of 450 degrees Centigrade, whereupon the heating is stopped and the gaseous products withdrawn. Thus time is given for the hydrogenation, apparently, but prolonged heating which would cause decomposition of hydrogenated products is avoided.

It is exceedingly important that the catalyst be finely divided so as to expose as large a surface of same as possible to the reacting constituents, the oil and the hydrogen. The higher the pressure employed the more rapid and effective the hydrogenation becomes. The velocity of hydrogenation of an oil is given by the equation,

$$V=K\,C_1C_2$$

where,

V=velocity of the reaction,

K=the constant of the reaction,

C_1=active mass of the oil,

C_2=active mass of the hydrogen.

Hence C_1C_2 should be as large as possible, or in other works the product of the number of pounds of hydrogen per unit of time brought in contact with the pounds of oil should be large. Further, Le Chateliers principle states that those reactions are favored by pressure in which the product possess a smaller volume than the reacting substances. Thus Berguis has hydrogenated mineral oil and coal at high pressures without the use of a catalyst. With the use of the latter, temperatures and pressures can be reduced.

The hydrogen and the oil must be as intimately mixed as possible. In the hydrogenation of fats this is brought about by bringing the two into countercurrent flow with each other, and with mixing devices. The nickel or other catalyst is carefully prepared in a very pure condition in fat hydrogenation work. Sulphur, chlorine, phosphorous and arsenic are the worst poisoners. Other catalysts than nickel which have been used are palladium, colloidal, platinum, copper and iron.

Reaction Mono-Molecular

Fokin[4] has shown that the reaction is mono-molecular, i.e., that the saturation of a double bond with hydrogen at constant temperature and pressure follows the ordinary mono-molecular formula:

$$K=\frac{1}{t}\log_e\frac{a}{a-x}$$

where,

a=the total absorbable hydrogen,

x=the hydrogen actually absorbed after the time t.

The reaction is active at first and then slows down as saturation occurs, thus,

$$\frac{dx}{dt}=K\ (a-x)$$

The reaction is exothermic, i.e., heat is evolved. Maxted[5] found that in fat hydrogenation, a charge of oil increased in temperature from 140 to 185 degrees Centigrade.

Early Work on Problem

Early hydrogenation work was that of Sabatier and Senderens[6] in 1899, already cited. In 1906 Sabatier passed two volumes of ethylene and one volume of hydrogen through a tube one meter in length, containing freshly reduced and finely divided nickel; the gas on leaving the tube was passed through fuming sulphuric acid in order to absorb the excess of ethylene. The resulting gas was then found to be pure ethane. The reaction is $C_2H_4+H_2=C_2H_6$. Pressure should aid this reaction so Ellis and Meigs[7] undertook it using a pressure of 30 to 40 atmospheres. They found the experiment difficult to perform with equal quantities of the two gases, due to the sudden rise in temperature. The control of the apparatus was difficult and uncertain. But when a gas containing 80 per cent ethane, 10 per cent ethylene and 10 per cent hydrogen was passed (under pressure) through an iron autoclave filled with nickel pumice stone, success was attained, the resulting gas being pure ethane. One of Satabier and Senderen's most noteworthy pieces of work was the hydrogenation of benzol in the presence of nickel to make cyclohexane, a study that has often been quoted.

Rather and Reid,[8] and Paal and Schwartz,[9] have also hydrogenated acetylene and ethylene in the presence of the catalysts, nickel, copper or palladium.

Friess[10] is summing up the work of Waterman and Perkin (1925), Dunkel and Heim (1925), Kling and Florentin (1926) Spilker and Zerbe (1926) Hugel and Friess, and Fricke and Spilker (1925) upon the mechanism of hydrogenation, says that it has been shown that:

(a) Hydrogen may be simply added to the hydrocarbon molecule.

(b) Hydrogen may add itself to the molecule which then dissociates.

(c) The original molecule may be cracked directly.

(d) In either of the latter two cases the separate portions may again associate themselves into new molecules which are, or are not, hydrogenatable.

(e) The course of the reaction is influenced favorably by pressure between maximum and minimum limits, but the temperature is most important. High temperatures are unfavorable, the optimum for high yield being about 450 degrees Centigrade.

Prevention of Polymerizing

Waterman and Perquin[11] have noted that in hydrogenation there is no saturation of the unsaturated hydrocarbons already present in the coal, but only a hydrogenation of the products of decomposition obtained in cracking, and thus prevention of polymerizing reactions that lead to tar and coke.

Kling[12] states that by means of the catalyzing agents, nickel, iron and cobalt, etc., it has been possible to fix molecular hydrogen at normal or high pressure on many organic molecules, and that as far as molecular hydrogen is concerned pressure alone is not sufficient to allow fixation of molecular hydrogen on the atoms of a stable compound, but such fixation is possible by means of a catalyst. Generally speaking in hydrogenation it is necessary to rupture certain molecular groupings. As soon as the hydrogen passes from its nascent to molecular stage it is nearly impossible to obtain hydrogenation. Further, that hydrogenation increases with pressure, and dissociation with heat and to obtain effective hydrogenation it is necessary for a given pressure of hydrogen, to increase the temperature moderately and to reach a point where a balance can be obtained between velocity of dissociation and velocity of hydrogenation of the nascent molecules. If the optimum temperature occurs cracking occurs and not hydrogenation. Kling has determined these temperatures for many substances.

In hydrogenating the anthracene series in the presence of aluminum chloride he finds it important to add but a small quantity (1 to 5 per cent) of catalytic agent; otherwise rupture and polymerization prevails instead of hydrogenation, and in such cases a product is obtained with large quantities of solid substances insoluble in benzene. The anthracene nucleus is particularly fragile in this respect. Ferric chloride gives good results.

From petroleum tar and pitches he obtained gasoline and oils of the acrylic type; from coal tars and pitches he obtained benzene compounds. In other words the various classes keep their

[1]Second International Bituminous Coal Conference. Pittsburgh, Pa., November, 1928.
[2]E. P. 1,515 (1903).
[3]The earliest work was that of Berthelot, who hydrogenated coal and other substances with hydrogen evolved from hydriodic acid.
[4]J. Russ. Phys. Chem. Soc., 40, 276, 1908.
[5]Catalytic Hydrogenation and Reduction. p. 95-97.
[6]Sabatier, P. and J. B. Senderens. Compt. rend. CXXVIII, 1173; CXXXI, 40.267.
[7]Gasoline and other Motor Fuels. Carleton Ellis and Jos. V. Meigs, 1921, p. 372.
[8]Jour. Soc. Chem. Ind. 1915, 1072.
[9]Jour. Soc. Chem. Ind. 1915, 851.
[10]La Rev. Petrol., July 28, 1928, p. 1050.
[11]Jour. Inst. Pet. Tech. Aug. 1927, p. 542.
[12]Second International Coal Conference, Pittsburgh, Pa., Nov. 1928.

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molecular structure. Liguite tars gave a very suitable motor fuel containing a mixture of aromatic and aliphatic hydrocarbons. Low temperature coal tars were also hydrogenated to give motor fuel, aromatic phenols, etc.

Hugel[13] has hydrogenated coal tars, using hydrides of alkali and alkaline earth metals as catalysts. With 7 to 10 per cent catalyst coal tar was hydrogenated at 8-100 kg. pressure and 300 degrees Centigrade to give 30 per cent of green fluorescent oil and a black solid. The oil contained tetralin and polyaromatics such as chrysene, picene, etc.

Hydrogenation of Oil

The I. G. Farbenind A-G have taken out many patents covering the hydrogenation of hydrocarbons. One[14] of them covers the action of hydrogen on coal, tar, mineral oils and their distillation products at temperatures above 300 degrees Centigrade and preferably under pressure, in the presence of oxides of elements of the third to the seventh groups of the periodic system, precipitated in small proportions on metals and alloys. Examples are given of the production of benzenes, the main portion of which boils below 200 degrees, from mineral oil and lignite tar oil, using aluminum coated with uranium nitrate or boric acid or ammonium vanadate, or zinc wool evaporated with a suspension of the blue oxide of molybdenum at about 450 degrees Centigrade and 200 atmospheres.

Wagner[15] hydrogenated gasolines by passing them in vapor form along with dry hydrogen, over finely divided nickel. The results follow:

Sample No.	Before hydrogenation: Per cent absorbed by H_2SO_4	Before hydrogenation: Hanus iodine No. in per cent	After hydrogenation: Per cent absorbed by H_2SO_4	After hydrogenation: Hanus iodine No. in per cent
1	6.2	34.1	1.6	10.4
2	4.5	27.0	1.4	7.9
3	4.0	25.6	1.1	7.4
4	9.3	56.4	2.3	12.3

Hlavica[16] hydrogenated coals at temperatures of 430-470 degrees Fahrenheit and initial pressures of 65-110 atmospheres. Relative efficiencies of some of the best catalysts compared to Fe_2O_3 taken as 1, were:

$Fe_2O_3+ZnCl_2$	1.43
Co_2O_3+CuO	1.65
$NiCl_2$	1.70
CuCl	1.95
ZnO+KOH	1.70

$NiCl_2$ was the best catalyst for converting coal into oils. The amount of the catalyst used was usually 10 to 20 per cent of the charge.

Reaction in Three Stages

Hlavica considers that the reaction takes place in three stages.

(a) At 300-400 degrees Centigrade there is rapid absorption of hydrogen and deoxidation with water formation and conversion of the coal into an asphaltlike mass.

(b) Hydrogen is still rapidly absorbed and the asphalt mass becomes steadily softer until all the coal is converted.

(c) Rapid splitting of the molecules takes place with formation of gases and low boiling oils.

Hlavica[17] also investigated the influence of iron oxide on the hydrogenation of coal. He found that the drop in pressure of the iron oxide was always greater when iron oxide was present, the yield of semicoke was less, the yield of tar fractions above and below 300 degrees Centigrade greater, and the percentage of phenols in the oils greater, but the absolute quantity less.

Catalysts Tried

The best catalysts tried were zinc chloride, zinc oxide, nickel cobalt oxide and copper chloride. They did not permit the temperature to be lowered without affecting the yield of products, but increased the intensity of reaction, the rate of decomposition of the coal molecules, and the rate of hydrogenation only secondarily. Iron oxide as a catalyst was inferior to the above mentioned ones. The phenol and crude oil content were increased as much as 33 per cent. In the case of one coal, ferric oxide plus copper oxide yielded 6.8 per cent gasoline and 5.0 per cent of an oil boiling above 300 degrees Centigrade. It halved the time of reaction. For a certain coal zinc chloride yielded the best quality of lubricating oils, cobalt oxide increased the phenols, and nickel chloride was the best catalyst for lignites. Zinc chloride yielded the highest amount of gasoline, 14.1 per cent, and absorbed 6.5 per cent of hydrogen.

Hoffman and Lang[18] studied the action of hydrogen on benzol, diphenyl, toluol, cyclohexane, ethylene and pyridine. Benzol could not be hydrogenated at 485 degrees Centigrade and 250 atmospheres over three hours time.[19] Diphenyl heated for six hours at 500 degrees Centigrade and 200 atmospheres with hydrogen was mostly converted to benzol. Toluol was also converted to benzol. The methyl groups were converted to methane or combined to form ethane. Without hydrogen the toluol was virtually unchanged.

Cyclohexane, with hydrogen, at 490 degrees Centigrade and 212 atmospheres, partly went over to methyl cyclopentane; this in turn changed to cyclopentane. At 460 degrees with hydrogen and the same pressure cyclohexane was scarcely affected. Cyclohexane added on hydrogen even at 400 degrees Centigrade, producing up to 67 per cent cyclohexane. Polymerization products also formed. At 425 degrees Centigrade decomposition set in and lighter hydrocarbons than cyclohexane formed. When cyclohexane was heated without hydrogen benzol was formed, and also naphthalene at temperatures under 500 degrees Centigrade.

Ethylene heated with hydrogen below 400 degrees gave a predominance of saturated gases.

Some investigators have found it very difficult to hydrogenate petroleum itself in the presence of catalysts or not. This is attested, for instance, by work performed by W. F. Faragher[20]. In hydrogenating a wax distillate from Pennsylvania oil he was unable to observe any absorption of hydrogen in the presence of nickel and other catalysts even at pressures up to 1,000 pounds. Of course Pennsylvania itself is saturated, apparently largely, but there are some cracked unsaturated bodies in the wax distillate fraction. Shatwell[21] and Mott and Dunstan[22] found that gas oil at 1,800 pounds pressure and 400 degrees Centigrade took up an insignificant amount of hydrogen.

The Bergius Process

F. Bergius[23], of Germany, found that at pressures as high as 40 to 100 atmospheres and higher and temperatures of 572 to 932 degrees Fahrenheit profound changes are produced in wood, coal and oils. By applying heat in the presence of hydrogen under great pressures, to heavy asphaltic oils, he produced practically no coke and very little gas. A temperature of 450 degrees and a pressure at 100 atmospheres were used.

Using a commercial autoclave 30 feet long and 3 feet in diameter, Bergius cracked a heavy oil and produced a distillate of the composition:

Distillate	84 per cent
Residue	8 per cent
Gas	8 per cent

The distillate contained:

Benzene	30 per cent
Kerosene	25 per cent
Gas oil and fuel	37 per cent
Gas and loss	8 per cent

The hydrogen consumption was about 1 per cent and the benzene, after refining with less than 1 per cent acid and soda, was water white and contained 0.07 per cent sulphur. (The original cracking stock contained 1.02 per cent sulphur.) The kerosene was slightly colored and both benzene and kerosene had a pleasant odor. Fuel consumption was about 6.5 per cent. For a time efforts were concentrated upon transforming coal into oil; coal liquefaction, as it is called.

The following excerpts are from an address made by Doctor Bergius. The reactions involved are:

1. Hydrogen addition.
2. Splitting up of large molecules into smaller ones while new hydrogen is added.

In other words, it is a cracking process in which hydrogen combines chemically with products from the coal. The higher the temperature, the more the large molecules are broken up into smaller ones, to which the hydrogen is added, thereby changing the unsaturated smaller molecuis into saturated ones. The products of the reaction are paraffins, aromatics, naphthenes, phenols, cresols and ammonia. These are the chief products. No unsaturated bodies are formed. These cannot be formed in the presence of high-pressure hydrogen.

One short ton of coal yields 170 gallons of oil, of which 45 gallons is a highly aromatic (antiknock) motor fuel.

By weight 1,000 kilos of coal yields:

150 kilos marketable gasoline
200 kilos heavier oil
60 kilos lubricating oil
80 kilos fuel oil.

Method of Making Hydrogen

Hydrogen for the process is made from the methane evolved as part of the reaction. Methane from the gaseous reaction products is heated with steam at 1,100 degrees Centigrade, one molecule of water giving three molecules of hydrogen, thus,

$$H_2O+CH_4 \rightarrow 3H_2+CO$$

The carbon monoxide is transformed by the action of another molecule of steam at 700 degrees Centigrade and in the presence of a catalyst into carbon dioxide and hydrogen. Hence from one molecule of methane there is produced four molecules of hydrogen. Bergius states that without this process of producing cheap hydrogen, the process would not be commercial.

It is the author's information that the Bergius process as such is not in commercial operation. The I. G. Farbenindustrie took it over and built a plant, but a catalyst is used to speed up the reaction. Further, they do not work on coal, but on pitches, tars and oil residues. These are unsaturated to a considerable degree, having been already drastically heated and cracked, hence are in prime condition for the addition of hydrogen, compared to the saturated molecules in virgin coal and oil, which must be cracked and then hydrogenated. The tars, pitches and oil residues do not have to be heated to as high a temperature for hydrogenation, hence do not enter to the same extent the temperature zone of decomposition, where hydrogenated products, already formed, tend to decompose.

Methanol

The outstanding work in the hydrogenation of carbon monoxide, from an early, scientific and commercial standpoint, was that of the Badische Anilin u. Soda Fabrik of Germany, when in 1913, they synthesized methanol (wood alcohol). This work preceded by years the later work of Fischer and Tropsch, Patart, Audibert, Kling, Nash and others. The work was done at high pressures, 120 atmospheres, with the carbon monoxide in excess and in the presence of metaloxide catalysts. In 1923 the work was commercialized and the introduction of the synthetic product into the United States so threatened to disrupt the home industry (wood alcohol from wood distillation) that the import duty was raised on it. Now the Du Pont company and the Commercial Solvents company have erected plants in the United States to produce methyl alcohol from hydrogen and carbon dioxide; not carbon monoxide. The Commercial Solvents Co. at their butanol plant in Terre Haute, Ind., pass gas from their fermentation vats which contains carbon dioxide and hydrogen, over a suitable catalyst at high pressures to make methyl alcohol. The reaction is:

$$CO_2+3H_2=CH_3OH+H_2O$$

I. G. Farbenindustrie Process

Another process of hydrogenating coal and oil is that of the I. G. Farbenindustrie Co.[24] of Germany, already mentioned. The I. G. process, as it is called, is one of hydrogenation under high pressure using a catalyst, as distinct from the Bergius process which hydrogenates without a catalyst. It is stated that 100 gallons of lignite yields 100 gallons of motor fuel and a commercial quantity of lubricating oil. This company controls the Badische Anilin and Soda Fabrik Co., hence it also owns the methanol synthesis process discovered by the Badische company in 1913.

Krauch has given further information about the I. G.'s work in hydrogenating coal oil and tar. He states that in addition to producing methanol[25] from carbon monoxide and hydrogen by a suitable catalyst, with other catalysts, chiefly propyl, isobutyl, hexyl and heptyl alcohols, aldehydes and ketones or hydrocarbons are prepared. Tar is converted into a water clear gasoline with only 10 per cent of the carbon content being lost in the form of gaseous products. The catalysts are not poisoned by sulphur and oxygen compounds.

Also from hydrogen and coal and catalysts, can be produced gasoline, kerosene or lubricating oils, according to the catalyst used. Phenols disappear, oxygen is removed as water or as carbon dioxide and only hydrocarbons formed. The sulphur goes off as hydrogen sulphide. The sulphur in Mexican Panuco oil falls to 0.10 per cent or under; in the gasoline, aliphatic, hydroaromatic or aromatic base materials, the corresponding types of hydrocarbons can be obtained, or aliphatics can be converted into aromatic products.

This work recounted by Krauch covers a record of achievement unsurpassed in the catalytic field. It can be stated that the I. G. Farbenindustrie controls a group of enterprises of monumental proportions and their research workers are many. Krauch is the director of the research work and a vice president of the organization.

As already stated, the I. G. have a hydrogenation plant at Leuna, Germany, using a catalyst, that hydrogenates tar to produce 300,000 tons of motor fuel per year. The tar is made at a low temperature coal carbonization plant nearby.

Standard Oil Co. Plant

The Standard Oil Co. of New Jersey is now building two cracking-hydrogenation plants whereby it is claimed that cracked residues from their ordinary temperature-pressure cracking units can be converted into 100 per cent of gasoline. Pressures of 3,000 pounds upwards are used. In one of their patents[26] the oil is subjected to a pressure of 50-100 atmospheres and 750-850 degrees Fahrenheit and agitated with hydrogen. The process may be batch or continuous in a vessel having nonreactive steel alloy surfaces. Metal oxides or other catalysts, e.g., a mixture of 9 pounds of chromium oxide with 1 pound of molybdenum oxide should be suspended in the oil. The cracked, hydrogenated and desulphurized product is fractionally condensed, treated with 10-50 per cent of 98 per cent sulphuric acid or with fuming sulphuric acid, then with caustic soda solution, blown dry, and filtered through fuller's earth. In a second example, oils containing large amounts of unsaturated compounds, e.g., cracked oils, are hydrogenated without cracking by treatment at 650 degrees Fahrenheit and 100 atmospheres.

In the latter case unsaturated products are present in quantity due to their having been already produced in cracking stills. In the former case the cracking to produce unsaturated bodies and the hydrogenation of them are carried on simultaneously. This work of the Standard Oil Co. of New Jersey follows the I. G. Farbenindustries work already described and resulted from an agreement with the latter concern whereby the

(Continued on Page 245)

[13]Can. Chem. Met. 13, 5-7 (1929).
[14]Fr. Pat. 651,891, Mar. 1928.
[15]Nat. Pet. News. April 14, 1926, p. 85.
[16]Brennstoff-Chem. 9, 229-31 (1928).
[17]Brennstoff-Chem., May 15, 1929, p. 201.
[18]Brenn-Chem. May 15, 1929, p. 203.
[19]Benzene hydrogenates readily in the presence of nickel. This was first shown by Sabatier and Senderens.
[20]Personal communication.
[21]Jour. Inst. Pet. Tech., 10, 903 (1924).
[22]Idem., 10, 911 (1924).
[23]Second International Bituminous Coal Conference, Pittsburgh, Pa., Nov., 1928.
[24]Second International Bituminous Coal Conference, Pittsburgh, Pa., Nov., 1928.
[25]The former Badische Anilin u. Soda Fabrik process.
[26]E. P. 308,297. Mar. 21, 1928.

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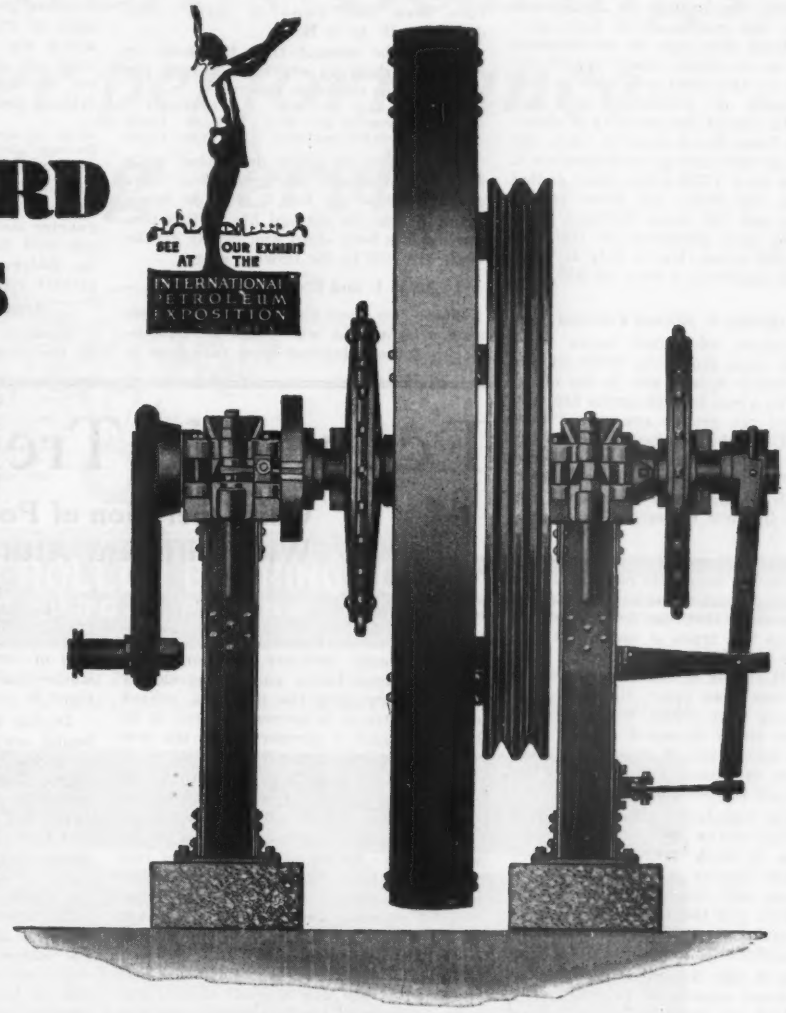

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Spacing of Wells in Long Beach Field

Recovery per Acre in Wider Spaced Zones Has Not Equaled the Recovery from Areas Which Were Closely Drilled

By Dwight C. Roberts and Stender Sweeney*

A great amount of discussion concerning the spacing of wells in Long Beach oil field has taken place from the earliest days of its development up to the present time. This discussion has been brought about by the closely drilled town-lot areas which have been as intensively developed as any productive areas in the world. It is, therefore, the purpose of this paper to present the results which have been obtained from this type of development compared to the more widely spaced development in this field now that a sufficient length of productive life has elapsed. An idea of the intensity of development in Long Beach is given when one considers the fact that up to September 1, 1929, there were 1,736 wells either drilled or drilling. Of these, 165 failed to get production and 121 were drilling. Thus 1,450 wells have produced oil from an area of 1,350 acres. Up to July 1, 1929, these wells produced a total of 355,047,913 bbls.

Description of Method Pursued

Four groups of offset areas were chosen; in each group the wells in one area are widely spaced and in the other, closely. The areas in each group are contiguous and the groups are spread over the field from the southeast end to the northwest so that representative data are assured. The comparison has also been divided into shallow and deep zones and like zones in their respective areas compared.

It is thus believed that, even though these productive zones are of great thickness, a fair picture of results is obtained due to the fact that the drilling of the wells in the two types of areas was concurrent in the different groups and, as a rule, the thickness of sand opened up at any one time was about the same. As deeper sands were found, wells in offset areas were either deepened or new ones drilled in both types of areas. The basis of division of zones was made in the same manner in contiguous areas.

The total cumulative production up to July 1, 1929, of the wells in their respective zones in each area was obtained. From these figures were computed the recovery per well, recovery per acre, acreage per well, and the ratios of these factors. Thus July 1, 1929, is the end of the period considered in all areas.

Areas A and A'—Shallow Zone

These areas consist of 70 acres each, one of which has been drilled on a more widely spaced program and the other very closely. These wells have been producing about six years.

	No. wells	Total recovery	Recovery per well	Recovery per acre
A	24	6,397,665	266,569	91,395
A'	98	13,759,127	140,399	196,558

In area A the average acreage per well is 2.92 while in A' it is 0.71. Thus it is apparent that the recovery per well has been greater in the more widely spaced area while the recovery per acre, and consequently the total recovery, has been greater in the closely drilled area. The following proportions between these factors have been computed:

Ratio of acreage per well...	A' to A	1:4.08
Ratio of recovery per acre..	A to A'	1:2.15
Ratio of recovery per well...	A' to A	1:1.89

This shows that four times as many wells have been drilled in A' as in A. The recovery per acre has been more than twice as great in the closely drilled area while the recovery per well has been slightly less than half as much.

Areas B and B'—Deep Zone

These consist of 20 acres each. This development has taken place during the last year and a half. B is the wider spacing and B' the town-lot.

	No. wells	Total recovery	Recovery per well	Recovery per acre
B	6	1,399,827	231,638	69,990
B'	24	5,471,061	227,961	273,553

In area B the average acreage per well is 3.33, while in B' it is 0.83. Thus there have been four times as many wells drilled in B' as in B.

Up to the present time the wells in each area show an average recovery per well of about the same amount.

Ratio of acreage per well...	B' to B	1:4
Ratio of recovery per acre..	B to B'	1:3.98
Ratio of recovery per well...	B' to B	1:1.02

Four times as many deep zone wells here have produced practically four times the amount of oil, but it must be borne in mind that the elapsed life of this production has been short and nearly all the wells are still in the flowing stage.

Areas C and C'—Shallow Zone

These two areas also consist of 20 acres each, C being the wider spaced. Production has been obtained from this zone in these areas for almost seven years. Nearly all the development took place during their early life.

	No. wells	Total recovery	Recovery per well	Recovery per acre
C	6	2,824,113	470,685	141,206
C'	23	3,621,756	157,468	181,088

In area C the average acreage per well is 3.33. The productive life of these wells has been great enough to give a very fair basis of comparison of two offset areas which are well along in the pumping stage on similar positions structurally, but developed on a radically different drilling program.

Ratio of acreage per well...	C' to C	1:3.83
Ratio of recovery per acre..	C to C'	1:1.28
Ratio of recovery per well...	C' to C	1:2.99

Thus, somewhat less than four times as many wells have obtained about one-quarter more oil. However, the recovery per well has been three times as great on wider spacing with the attendant greater return per dollar invested.

Areas C and C'—Deep Zone

These are the same areas considered in the preceding discussion, but attention is directed toward the results of deep zone drilling which started a little short of two years ago and continued concurrently in both areas.

	No. wells	Total recovery	Recovery per well	Recovery per acre
C	8	1,655,407	206,926	82,770
C'	20	2,760,981	138,050	138,050

In area C the average acreage per well is 2.5 while in C' it is 1.0.

Even though these wells are in the earlier stage of their lives many have been on the pump or compressor for some time. Neither of these areas gives promise of reaching the production obtained from shallow zone wells in these same areas.

Ratio of acreage per well ..	C' to C	1:2.5
Ratio of recovery per acre ..	C to C'	1:1.43
Ratio of recovery per well ..	C' to C	1:1.67

The wells drilled for the deep zone in the C area were more closely spaced than wells drilled for the shallow zone in the same area. At this point of their lives the deep wells show a greater proportion-

(Continued on Page 204)

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Economic Trend of Oil Situation

Unit Operation of Pools Will Result in Great Changes With Different Attitude on Part of Small Concerns

By Joseph E. Pogue
Consulting Engineer, New York*

New economic forces are at work in the petroleum industry. In order to visualize these forces and to see clearly their bearing upon the producer, refiner and marketer, it is necessary, first, to go back and gain a perspective of the economic evolution of the business.

For several decades prior to 1911, the outstanding feature of the petroleum industry was a trend toward integration, culminating in a huge combine, the Standard Oil Co. An important aspect of this integrative trend, however, was its concentration upon a combination and control of refining and marketing, leaving crude oil production, for the most part, to the exigencies of small-unit competition. It is a noteworthy coincidence that during this era the law of oil and gas was formulated and applied, whereby these substances had to be reduced to possession to establish ownership; and the forces of competition in crude oil production were thereby intensified. It was to the interest of an industry, safeguarded in its control of manufacturing and markets, to have supply stimulated by legal convention as well as by individual initiative in order that the growing demand could be met without interruption. And so overproduction of crude oil during this era was no handicap, but rather an aid, to the progress of the industry.

Era of Competition

But the idea of superintegration, despite its efficiencies, became repugnant to the temper of the times and so the Standard Oil Co. was dissolved by court decree—disintegrated into over 30 parts. And thus, in 1911, was ushered in the second era of the petroleum industry, a period of intense competition. This era coincided with the development of automotive transportation, and a tremendous growth resulted in the effort to keep pace with the mounting demand for gasoline. An intense individualism and unbridled competition were appropriate to this period of entry into the gasoline age; the wastes incidental to it were lost in the vigor of the growth.

During this second period, again, the feudal law of oil and gas was not unfit, or at least did not run seriously counter to the needs of the situation. For a time, indeed, it appeared that the supply of oil might fall short and so a "shortage idea" was born, which brought the larger companies hurrying into the field of production. This change was most important, for while it did not materially decrease competition, it resulted, first, in a differentiation of the field into two components, the independent producer and the producer affiliated with refining; and, second, it brought about a tremendous expansion in the technology of oil finding and oil production.

As a result, then, of an old law, inherited from the past, of the desire of large companies to assure themselves of an owned reserve of crude oil, and of revolutionary advances in technique, the supply of crude oil gained such impetus that new economic forces have been generated which are now carrying the petroleum industry into its third stage, marked by a return toward integration and control, as opposed to disorganized competition. It has become apparent, in short, that supply left to competitive forces alone results in chronic overproduction and, therefore, the manner of conducting the business must necessarily undergo a change to eliminate this flaw from an activity otherwise sound in its attainments and prospects. It is precisely the remedy of this defect that constitutes the major problem before the industry today, and it is fairly clear along what lines the solution will be found.

Changes Forthcoming

If present economic trends continue to their logical conclusion, the following changes in the petroleum industry will be witnessed:

The fundamental law of oil and gas, now at variance with economic needs and sound engineering practice, will be changed or modified; and oil pools will be operated as units.

Pending this change, the competitive pools will be more quickly depleted than the noncompetitive, or unit, pools, leaving the latter segregated more and more in the hands of the larger companies (i.e., producers affiliated with refining). This process will tend to lessen the role of the so-called independent producer. When this is appreciated, the independent producer, as a defense against the elimination from the oil business, will change his present opportunistic policy and work for a revision in the basic law of oil and gas, and also bend his efforts toward the furtherance of unitization and co-operation, developments really more essential to him than to the integrated company.

Physical integration will proceed to much further lengths than it has thus far attained, and the result will be the concentration of the industry into fewer and larger units, competing in the lowering of costs and the improvement of products and service, but co-operating in the control of supply.

Rationalization in the petroleum industry will be attained first in the refining and marketing branches, where this undertaking will meet less resistance and then proceed more slowly to the field of crude oil production, where more serious delays will intervene because of the inertia of obsolete legal restrictions and the ill-advised opposition of small interests.

While progress in the direction indicated will doubtless be slow, the logic of the situation is such that the forces of reaction will not prevail indefinitely and the forces of progress will in time gain the ascendancy. The very seriousness of the petroleum situation today, as it rounds out a decade of almost unbroken overproduction, is perhaps the best guarantee of the ultimate correction of the flaw that prevents this great activity from assuming its rightful place among the orderly conducted industries.

*Presented before the Tulsa meeting of the American Institute of Mining & Metallurgical Engineers.

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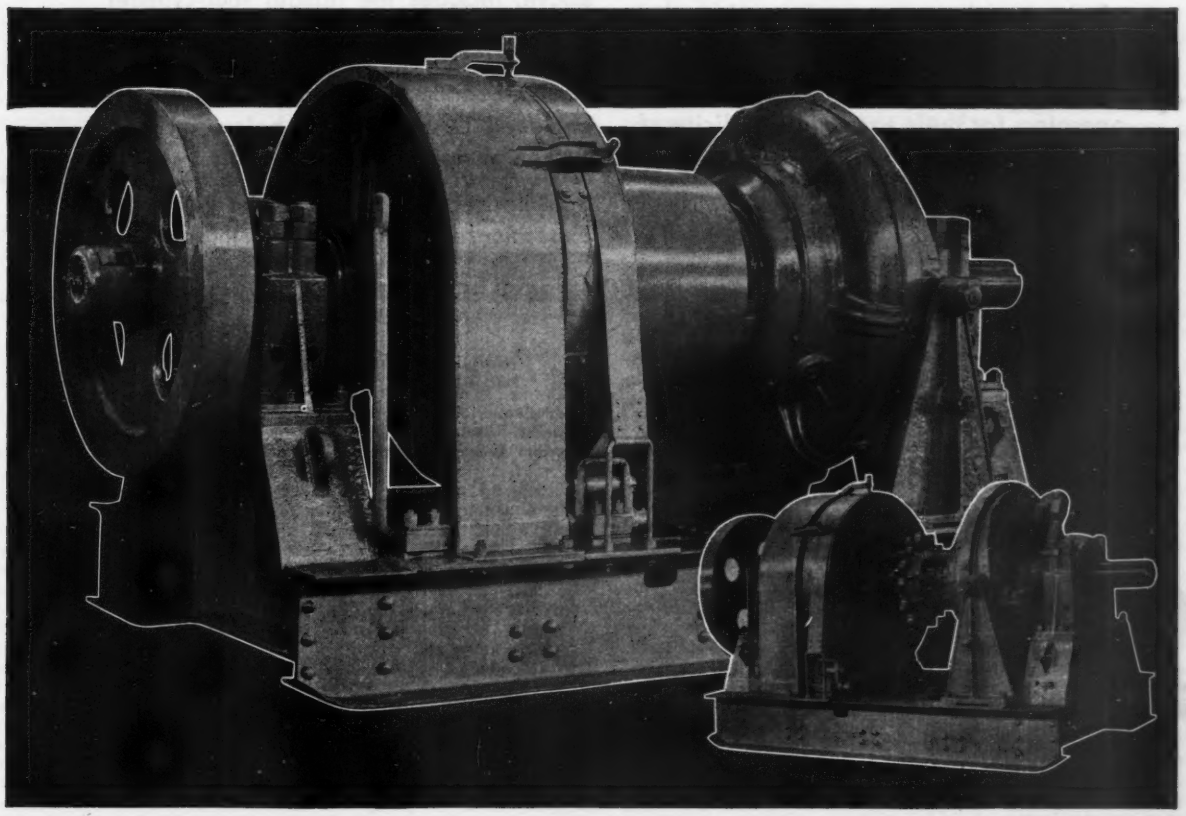
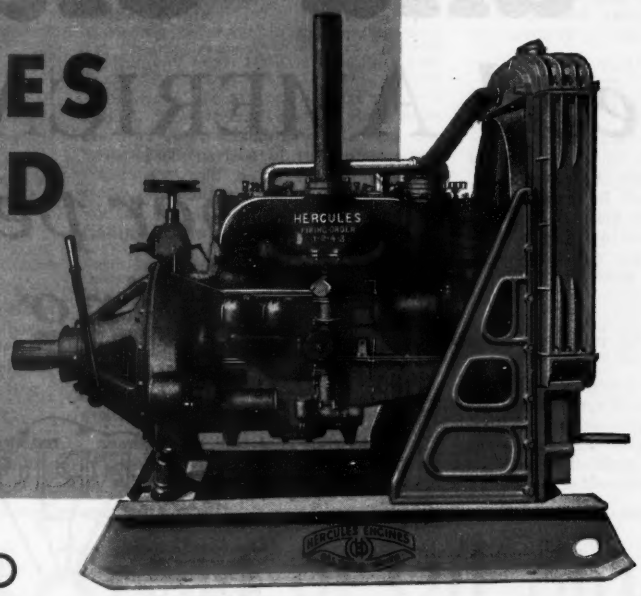


The new Emsco Model "F" 300 H.P. Reverse Gears are equipped with American Heavy Duty Bearings. American Bearings are made especially for the heaviest and hardest jobs of drilling. Installed correctly, they do not require adjusting in the field.

HERCULES OIL FIELD POWER UNITS



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Hercules Engines are noted among oil field operators for their extreme simplicity of design, sturdiness of construction and advanced engineering features—and for their reliable, economical performance under the most exacting operating conditions.

The Hercules TXO Oil Field Unit, illustrated above, includes the famous four-cylinder TX Series Hercules Engines, especially equipped for oil-field use, together with Timken-Bearing Clutch power take-off. The enclosed TX Series Unit below includes Timken-equipped reduction gears.

See the Hercules Exhibit at the Petroleum Exposition, or write for complete information.

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Hercules Power Units and parts are also carried by the Norvell-Wilder Hardware & Supply Company of Houston, Texas; Beaumont, Texas; Fort Worth, Texas, and Shreveport, Louisiana

HERCULES ENGINES

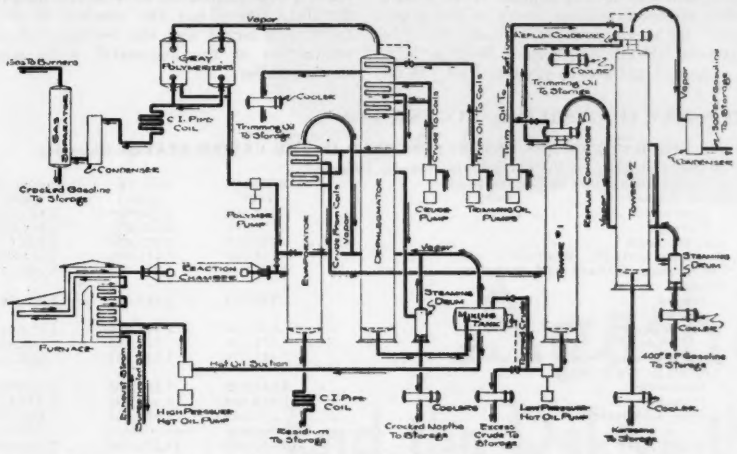
Flexibility In Cracking Operation

Cracking Unit at Waverly Refinery Uses Several Grades of Raw Material, Dependent on Marketing Conditions

By D. W. Hovey
Vice President, Waverly Oil Works Co.

Waverly Oil Works Co. in 1923 installed at their Pittsburgh plant a cold oil Cross cracking unit which was one of the first if not the first Cross unit built in the Pittsburgh district. This unit was a decided improvement over the shell type and is still capable of satisfactorily producing gasoline from gas oil.

The Coraopolis plant running Mid-Continent or Kentucky crude was in need of cracking facilities capable of handling other than gas oil. This problem was somewhat different than that which confronted our Pittsburgh plant which operates only on Pennsylvania crude and requires cracking of a clean gas oil only. We had the following to consider: (1) Isolation of straightrun gasoline or naphthas from cracking gasoline. (2) Conservation of ground space. (3) Cracking of either heavy residual fuel oil or distillates.



Cross cracking unit with Gray polymerizers at Waverly Oil Works Co. plant at Coraopolis, Pa.

After consultation with the M. W. Kellogg Co. engineers a Cross hot oil cracking unit combined with crude fractionating equipment was considered the best solution. This unit, requiring only an area of 125 feet by 140 feet, consisted of cracking and crude fractionating equipment, Gray towers and continuous treater, together with small auxiliary pipe still.

It is possible to run this unit either as a cracking still only or simultaneously with crude, with the crude supplying 100 per cent of the stock for cracking, or additional cracking stock may be added as desired.

The crude oil is pumped through coils in top of both Cross evaporator tower and fractionating tower which serves to partially control tower temperatures and sufficient heat is picked up in this manner to distill over all gasoline, naphthas, kerosene and at times a gas oil cut.

The heated crude is discharged into crude evaporator tower, the overhead from this tower is fractionated into the desired cuts in crude bubble tower. The reduced crude in bottom of the evaporator tower is either discharged to mixing tank or through auxiliary pipe still where it can be discharged either to Cross evaporator tower or mixing tank.

A charging stock which consists of either reduced crude and overhead distillate taken from Cross evaporation tower and fractionating tower or the overhead distillate only is taken from mixing tank by hot oil pumps and circulated through the Cross cracking still.

The cracked gasoline is taken from top of bubble tower through Gray treating towers, condensers and gas separator to storage tank from where it is brought to continuous treater for final treatment finishing a water white gasoline standing doctor and corrosion test.

A side cut is taken from the Cross fractionating tower and steamed in small stripping tower to desired flash test for light gas oil distillate similar in character to kerosene with exception of color, or, if desired, a heavy naphtha. Three cuts only are taken from crude fractionating tower, the overhead intermediate or side cut and bottom. The side cut is taken off through small stripping tower steaming to desired initial boiling point with the end point controlled by top temperature of evaporator tower and the amount of steam used in bottom of fractionating tower.

We have operated this still successfully in the following manner, charging crude oil to unit as described above with the reduced crude going either direct to mixing tank or through pipe still and then to mixing tank, the charging stock then being a combination of reduced crude and whatever overhead distillate is recycled from evaporator and bubble tower of cracking unit.

In order to make repairs on the crude fractionating equipment, crude oil has been charged through tower coils to mixing tank instead of the crude evaporator tower which of course, did not allow of isolation of the cracked and straightrun products. When repairs were completed the unit was changed over to separation of the straightrun and cracked products without shutting down.

The reduced crude oil from crude oil evaporator tower has been charged through auxiliary pipe still to Cross evaporator tower distilling over in evaporator tower gas oil from reduced crude with cracking stock then 100 per cent overhead product.

We have taken rerun and pressure benzine from out Pittsburgh plant which is pumped into the unit for fractionation and finishing without upsetting the operation whatsoever, the pressure benzine being isolated by pumping direct to Cross fractionating tower while the rerun has been charged with crude.

The unit can be run separately as a pipe still crude topping unit or as a cracking still only.

With a supply of gas oil from outside sources crude run can be varied from under 2,000 bbls. to over 4,000 bbls. per day, depending entirely on the products desired. In other words, the residual fuel oil from cracking can be taken to about 10 gravity or can be run to almost any desired gravity above this, the lighter gravity, of course, giving less overhead distillate for cracking stock.

Local conditions vary considerably operating conditions as will also change in markets, for instance, when there is a good demand for fuel oil with crude and fuel oil prices making it profitable to run for large production of fuel oil. This unit allows great flexibility in increasing or decreasing percentage of residual fuel recovery. In like manner an additional yield of straightrun gasoline can be secured by increasing the crude throughput.

The cracked gasoline yield is more or less constant which can only be increased by raising transfer line temperatures with a resultant increase in loss and wear and tear on equipment.

The yield of gasoline from crude oil is somewhat greater when charging residual products to cracking coil, however, the time on stream is much shorter than when cracking an overhead product only.

Coke formed in reaction chamber is also much harder and better quality than secured from cracking of residual oils. The antiknock quality of the cracked gasoline increases with the greater degree of cracking, however, as stated above the harder cracking will produce a greater loss and greater abuse of equipment.

Condenser Equipment

Two types of condensers are used. The cracked gasoline coming from Gray towers passes first through cast iron pipe condensers then through a tubular condenser which has proven very satisfactory. The residual fuel oil from evaporator tower passes through a cast iron pipe cooler only. The trimming oil and straightrun gasoline or naphthas are condensed in tubular condensers only.

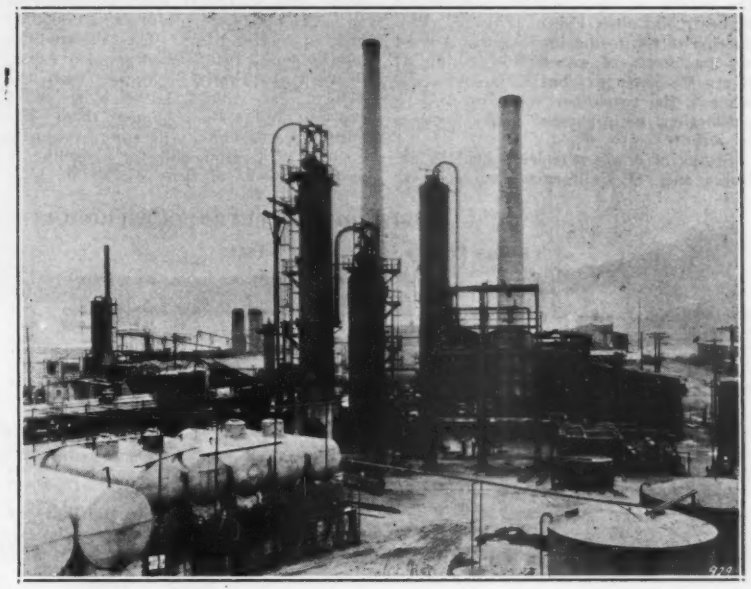
We have had some trouble with the straightrun gasoline condenser due to corrosion, which corrosion takes place at point vapors start to condense necessitating periodic removal of the tube bundle and replacing with a spare which is constantly kept on hand.

I believe that most of the corrosion difficulties we are experiencing in this condenser would be eliminated if vapors were wholly or partially condensed in a cast iron pipe cooler, thence passing into tubular condenser similar to equipment handling cracked gasoline vapors.

Developments in metals used in making small tubes for this type condenser, such as stainless steel and other products will greatly lessen corrosion troubles.

Local water conditions causing dirt and rust accumulation on outside of tubes is also a factor, and we find it good practice to periodically reverse flow of water on these condensers which is of material help in keeping clean and maintaining cooling efficiency.

The outstanding feature of this equipment is the remarkable flexibility, which as noted, is due more to use of fractionating equipment of more or less standard type combined with cracking still rather than development of the actual cracking equipment.



General view of distilling equipment at Waverly Oil Works Co.'s Coraopolis refinery.

LOS ANGELES PLANS TO HOLD PETROLEUM SHOW

Oil men from throughout the world are expected to attend the first annual Oil Equipment and Engineering Exposition, which will be held in Los Angeles, Calif., March 16 to 23, 1930. Officials of the exposition have been working for months on the many details connected with the undertaking.

The exposition will be held in the Shrine Auditorium, only 12 minutes ride from the heart of the city. In this building will be housed exhibits from leading manufacturers of the United States, including many new products and devices of great interest to men of the petroleum industry. It is planned also to have engineering and scientific exhibits by the various mining bureaus, engineering societies, and colleges and universities having petroleum engineering courses.

The main exposition building has a total floor space of over 100,000 square feet, divided into three floors. Outside space, adjoining the main exposition building, has been provided also to facilitate the erection of derricks and other large equipment.

Within 40 minutes ride from Los Angeles is Signal Hill, one of the wonder oil fields of the world. Santa Fe Springs, Huntington Beach, Compton, Torrance, Inglewood, Ventura and other productive fields are within easy reach of Los Angeles. Plans are being made to show visitors many of the points of interest in and around Los Angeles.

Bureau of Mines Statistics for Month of August

Prepared under the supervision of G. R. Hopkins, petroleum economics division. E. B. Swanson, acting chief economist.

Crude Petroleum

According to reports received by the Bureau of Mines, Department of Commerce, the production of crude petroleum in the United States during August, 1929, amounted to 92,288,000 bbls., a daily average of 2,977,000 bbls., and a new record. This represents an increase in daily average production over the previous month of 31,000 bbls.

Daily average production in Texas in August rose to 896,000 bbls. from 873,000 bbls. the previous month. This was an increase of 23,000 bbls., making Texas largely responsible for the increase in national output. Production in West Texas fell off slightly in August but this was more than compensated by the flush production obtained from the Gray County (Panhandle) Field. Certain Texas Gulf Coast Domes, particularly Barber's Hill, showed renewed activity in August and the output of that district rose to the highest point since February, 1927. Production in California increased in August as the result of successful drilling at Santa Fe Springs; but Oklahoma and Kansas, the two other states with flush production, both showed slight declines in output.

Stocks of crude petroleum held by refiners east of California declined over 1,000,000 bbls. in August but other classes of stocks increased materially, so that the net total increase east of California amounted to nearly 3,350,000 bbls. This compares with an increase of approximately 4,250,000 bbls. during the previous month. Production of crude in California continued to exceed the demand by a wide margin and stocks of light and heavy crudes in that State increased nearly 6,000,000 bbls.

Refined Products

Runs to stills of crude petroleum in August totaled 86,733,000 bbls., of which 80,443,000 bbls. was domestic crude petroleum and 6,290,000 bbls. was foreign crude petroleum. In comparison with July, these represent an increase in the use of domestic crude but a decrease in use of foreign crude.

Gasoline production again rose to a new peak in August, when the daily average was 1,242,000 bbls. as compared with 1,221,000 bbls. in July and 1,095,000 bbls. in August, 1928. The indicated domestic demand for gasoline also established a new record in August, when the daily average was 1,218,000 bbls., or 14 per cent higher than August, 1928. Exports were lower but the record domestic demand was responsible for a decline in gasoline stocks of from 37,880,000 bbls. on August 1 to 33,788,000 bbls. on August 31. At the current rate of total demand, the latter represents 24 day's supply as compared with 27 days' supply on hand a month ago and 22 days' supply on hand a year ago.

The production of kerosene increased materially in August, but so did total demand, hence stocks declined. The production of lubricants increased but stocks were again drawn on as demand continued above that of a year ago. The production of wax increased but stocks were reduced for the first time since August, 1928.

The refinery data of this report were compiled from schedules of 345 refineries which had an aggregate daily recorded crude oil capacity of 3,458,000 bbls. These refineries operated during July at 81 per cent of their recorded capacity, given above, as compared with 346 refineries operating at 81 per cent of their capacity in July.

Statistics of Important Fields, August, 1929

The production of crude petroleum in the Seminole district and in West Texas, the two most prolific areas in the country, both showed small declines in August. Seminole declined from a daily average of 424,000 to 420,000 bbls.; West Texas fell from 409,000 bbls. in daily average production to below the 400,000 mark, namely, 394,000 bbls. Long Beach showed practically no change but production in the Santa Fe Springs Field continued to rise and amounted to a daily average of 282,000 bbls. in August, an increase over July of 20,000 bbls. The Oklahoma City Pool, reported for the first time in this compilation, produced an average of 40,000 bbls. in August. This represents a material increase over July.

Stocks of crude petroleum held in the Seminole district declined from 18,766,000 bbls. on August 1 to 18,320,000 bbls. on August 31. This was the largest decrease that has occurred in these stocks for some time.

The number of drilling wells in the four fields of Seminole, West Texas, Long Beach, and Santa Fe Springs continued to increase and amounted to 813 on August 31, as compared with 772 the previous month. The Long Beach Field was the only one of the four to show a decline in this respect. Completions in West Texas in August were nearly double the July figure but the number of dry holes was larger and the average initial production of the successful wells was much smaller.

PETROLEUM, PETROLEUM PRODUCTS AND NATURAL GASOLINE, AUGUST, 1929.

PRODUCTION AND GRAVITY (A.P.I.)

(Barrels of 42 U. S. gallons)

	August, 1929 Total	August, 1929 Daily av.	July, 1929 Total	July, 1929 Daily av.	August, 1928 Total	August, 1928 Daily av.	Av. grav.
Seminole	13,050,000	420,000	13,134,000	424,000	9,325,000	301,000	39.0
St. Louis, etc	.....	.....	.....	.....	2,047,000	66,000	40.0
Oklahoma City	1,242,000	40,000	.....	.....	.....	.....	39.0
West, Texas	12,218,000	394,000	12,676,000	409,000	11,210,000	362,000	30.0
Long Beach*	5,426,000	175,000	5,387,000	174,000	5,918,000	191,000	26.0
Santa Fe Springs*	8,727,000	282,000	8,135,000	262,000	1,227,000	40,000	33.0

*From American Petroleum Institute.

STOCKS AT SEMINOLE-ST. LOUIS, ETC.

(Barrels of 42 U. S. gallons)

	August, 1929	July, 1929	August, 1928*
Producers' Stocks	642,000	561,000	438,000
Tank-farm stocks	17,678,000	18,205,000	17,258,000
Total stocks	18,320,000	18,766,000	17,696,000

*Includes stocks at Seminole only.

RECORD OF WELLS, AUGUST, 1929*

	Completions: Oil	Gas	Dry	Total initial production (bbls.)	Average initial production (bbls.)	Drilling Aug. 31
Seminole	54	4	28	52,200	1,000	307
St. Louis, etc	..	.	..	.....	..	...
West Texas	63	3	40	45,800	700	253
Long Beach	11	.	2	11,200	1,000	77
Santa Fe Springs	26	.	1	81,600	3,100	176

*From The Oil and Gas Journal.

ANALYSIS OF SUPPLY AND DEMAND OF ALL OILS

(Including wax, coke, and asphalt in thousands of barrels of 42 U. S. gallons)

	Aug., 1929	July, 1929	Aug., 1928*	Jan.-Aug. 1929	Jan.-Aug. 1928.*
NEW SUPPLY:					
Domestic production:					
Crude petroleum:					
Light	83,407	82,878	69,959	605,751	525,877
Heavy	8,881	8,449	7,848	65,979	63,746
Total crude	92,288	91,327	77,807	671,730	589,623
Natural gasoline	4,507	4,417	3,438	33,824	27,409
Benzol	264	264	233	2,054	1,841
Total production	97,059	96,008	81,478	707,608	618,873
Daily average	3,131	3,097	2,628	2,912	2,536
Imports:					
Crude petroleum	5,800	6,122	6,141	55,774	52,210
Refined products	3,429	3,176	1,007	17,678	8,617
Total new supply all oils	106,288	105,306	88,626	781,060	679,780
Daily average	3,429	3,397	2,859	3,214	2,786
Increase in stocks all oils	5,104	6,537	†2,886	58,862	19,185
DEMAND:					
Total demand	101,184	98,769	91,512	722,198	660,595
Daily average	3,264	3,186	2,952	2,972	2,707
Exports:‡					
Crude petroleum	2,236	3,117	1,883	16,848	12,225
Refined products	12,621	12,358	10,810	90,668	93,186
Domestic demand	86,327	83,294	78,819	614,682	555,184
Daily average	2,785	2,687	2,543	2,530	2,275
Excess of daily average domestic production over domestic demand	346	410	85	382	261
STOCKS (end of month):					
Crude petroleum:					
Pipe line, tank farm and refinery:					
East of California*	386,677	383,343	375,567	386,677	375,567
California§	146,047	140,076	113,367	146,047	113,367
Total crude§	532,724	523,419	488,934	532,724	488,934
Natural gasoline at plants	893	1,156	414	893	414
Refined products	138,449	142,387	126,980	138,449	126,980
Grand total stocks all oils	672,066	666,962	616,328	672,066	616,328
Days' supply¶	206	209	209	226	228
Bunker oil (included above in domestic demand)	4,734	4,593	4,564	35,134	34,192

*1928 figures are final and include producers' stocks. †Decrease. ‡Includes shipments to Alaska, Hawaii, and Porto Rico. §Includes fuel oil in California. ¶Grand total stocks all oils divided by daily average total demand.

NUMBER OF PRODUCING OIL WELLS COMPLETED*

Aug., 1929	Jul., 1929	Aug., 1928	Jan.-Aug., 1929	Jan.-Aug., 1928†
1,671	1,420	1,233	10,170	7,878

*For states east of California from The Oil and Gas Journal; for California from the American Petroleum Institute. †Final figures.

STOCKS OF CRUDE PETROLEUM HELD IN THE UNITED STATES (Barrels)

AT REFINERIES (and in coastwise transit thereto.) Reported by location of storage:		August 31 1929	July 31 1929	August 31 1928*
East Coast:				
Domestic		9,221,000	9,292,000	9,154,000
Foreign		4,370,000	4,910,000	4,946,000
Appalachian		2,697,000	2,723,000	2,258,000
Indiana, Illinois, Kentucky, etc.		2,834,000	3,119,000	2,891,000
Oklahoma, Kansas and Missouri		6,475,000	6,271,000	5,208,000
Texas:				
Inland		1,716,000	1,753,000	1,926,000
Gulf Coast:				
Domestic		10,461,000	10,512,000	7,814,000
Foreign		372,000	397,000	54,000
Arkansas and Inland Louisiana		1,468,000	1,511,000	882,000
Louisiana Gulf Coast:				
Domestic		4,104,000	4,160,000	4,690,000
Foreign		1,469,000	1,530,000	1,049,000
Rocky Mountain		1,811,000	1,933,000	1,545,000
Total east of California		46,998,000	48,111,000	42,417,000
ELSEWHERE THAN AT REFINERIES:				
Domestic—Reported by field of origin:				
Appalachian:				
N. Y., Pa., W. Va., Eastern and Central Ohio	Gross	4,819,000	4,834,000	5,960,000
	Net	4,578,000	4,551,000	5,657,000
Kentucky:	Gross	967,000	976,000	1,158,000
	Net	806,000	834,000	1,040,000
Lima-Indiana:	Gross	820,000	915,000	1,528,000
	Net	637,000	732,000	1,348,000
Illinois-S. W. Indiana:	Gross	11,254,000	11,273,000	12,570,000
	Net	10,598,000	10,615,000	11,909,000
Mid-Continent:				
Oklahoma; Kansas; Panhandle, Central, North and West Texas:	Gross	268,483,000	263,194,000	248,109,000
	Net	255,199,000	250,403,000	235,597,000
Northern Louisiana and Arkansas:	Gross	26,608,000	26,851,000	29,284,000
	Net	22,856,000	23,074,000	26,176,000
Gulf Coast:	Gross	20,915,000	21,047,000	18,304,000
	Net	20,374,000	20,473,000	17,813,000
Rocky Mountain:	Gross	24,522,000	24,378,000	26,702,000
	Net	24,465,000	24,328,000	26,665,000
Total pipe line and tank farm stocks east of California:	Gross	358,388,000	353,468,000	343,615,000
	Net	339,513,000	335,010,000	326,205,000
Foreign crude petroleum on Atlantic Coast		67,000	85,000	23,000
Foreign crude petroleum on Gulf Coast		99,000	137,000	62,000
		166,000	222,000	85,000
Total refinery, pipe line and tank farm stocks of domestic and foreign crude petroleum east of California		386,677,000	383,343,000	368,707,000
CLASSIFICATION BY GRAVITY (approx.):				
East of California:				
Light crude (24 degrees and above)		344,701,000	339,438,000	317,538,000
Heavy crude (below 24 degrees		41,976,000	43,905,000	51,169,000
California: Light (20 degrees and above)		37,685,000	34,430,000	18,310,000
Heavy (including fuel)		108,362,000	105,646,000	95,057,000
PRODUCERS' STOCKS (not included above, approx.):				
East of California		6,450,000	6,550,000	6,860,000
California		252,000	194,000	†

*Final figures. †Not available.

SHIPMENTS OF CALIFORNIA OIL THROUGH PANAMA CANAL TO EASTERN PORTS IN UNITED STATES (Barrels)

	August, 1929	July, 1929	August, 1928	Jan.-Aug., 1929	Jan.-Aug., 1928*
Crude oil	198,000	440,000	163,000	1,299,000	2,054,000
Refined products	2,643,000	2,501,000	1,963,000	17,066,000	13,566,000
Gasoline	2,367,000	2,346,000	1,700,000	15,027,000	10,734,000
Tops	.....	.....	88,000	....	259,000
Kerosene	.....	72,000	.....	72,000	1,000
Gas oil	203,000	76,000	165,000	1,727,000	1,610,000
Fuel oil	.....	4,000	2,000	70,000	713,000
Lubricants	71,000	1,000	5,000	150,000	232,000
Asphalt	2,000	2,000	3,000	20,000	17,000

*Final figures.

(Continued on next Page)

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Developed in the laboratories of the world's largest manufacturer of alloy steels, by metallurgists specializing in oil field requirements, Agathon Alloy Steel can be depended upon to drill more hole with fewer pullings and dressings.

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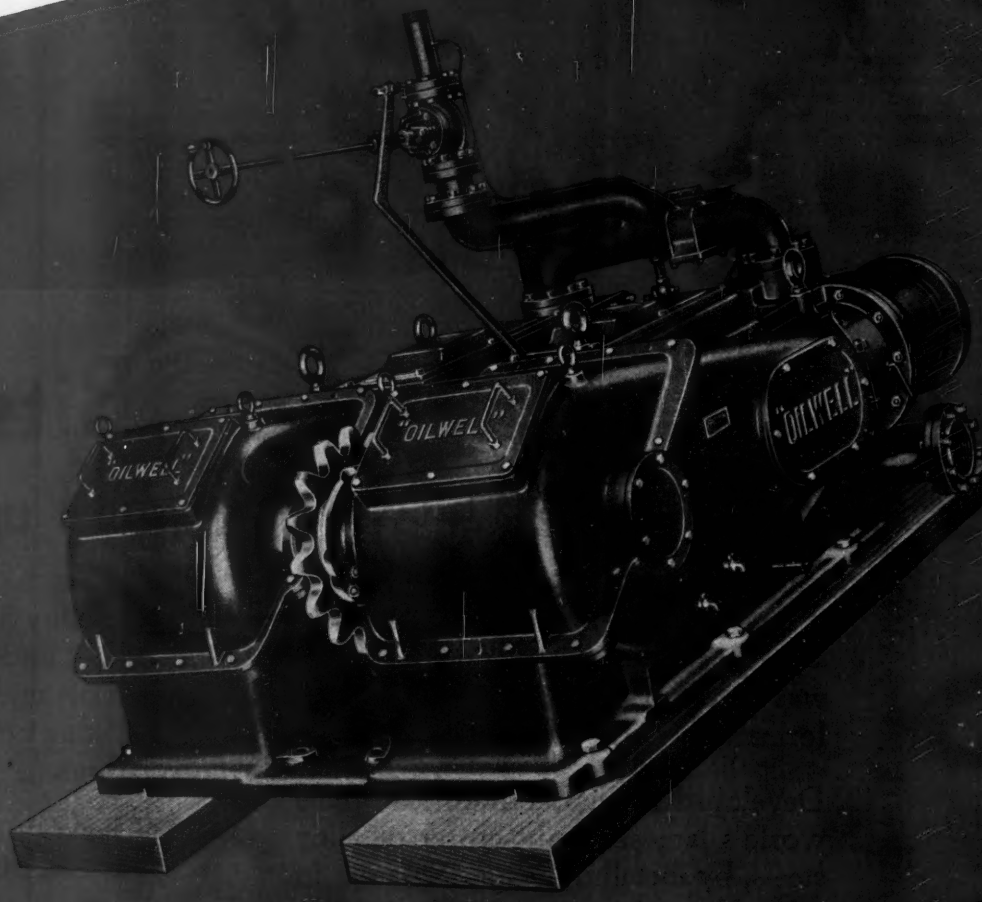
ALLOY STEELS

"OILWELL" engines



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for deep well drilling

THE "Oilwell" 12" x 12" Twin Cylinder Engine is a compact unit, ruggedly constructed. All working parts operate in oil baths, insuring smoother performance and longer life. These parts are fully enclosed, making the engine safer for inspection and adjustments. No protection from weather is necessary. Crank shaft is mounted in heavy duty Timken roller bearings, giving additional power and capacity. Both cylinders are controlled by one throttle. Designed for 250 pounds steam pressure.

"Oilwell" also makes an 11" x 11" Twin Cylinder Engine and a 12" x 12" Single Cylinder Engine—both of the enclosed type.

For complete information on "Oilwell" Twin Cylinder Engines, inquire at any of our branch offices or write for Bulletin No. 70.

SUPPLY CO.

PITTSBURGH, U.S.A.

BRANCH STORES
IN ALL OIL FIELDS

IMPORTS AND EXPORTS OF CRUDE PETROLEUM (Barrels)

(From Bureau of Foreign and Domestic Commerce)

	Aug., 1929		July, 1929		Jan.-Aug.,	Jan.-Aug.,
	Total	Dy.av.	Total	Dy.av.	1929	1928*
Imports	5,800,000	187,100	6,122,000	197,500	55,774,000	52,210,000
From Mexico	1,445,000	46,600	1,234,000	39,800	8,596,000	11,513,000
From Venezuela	3,016,000	97,300	3,973,000	128,200	36,851,000	30,358,000
From Colombia	914,000	29,500	792,000	25,500	8,068,000	8,442,000
From other countries	425,000	13,700	123,000	4,000	2,259,000	1,897,000
Exports	2,236,000	72,100	3,117,000	100,500	16,843,000	12,225,000
Domestic crude oil:						
To Canada	1,922,000	62,000	2,872,000	92,600	14,160,000	9,899,000
To other countries	314,000	10,100	245,000	7,900	2,681,000	2,325,000
Shipments	.....	.....	.....	.....	7,000	.....
Foreign crude oil	.....	.....	.....	.....	.....	1,000

*Final figures.

RUNS TO STILLS AND OUTPUT OF REFINERIES IN THE UNITED STATES, AUG., 1929

Input—	Crude oil: Domestic	Crude oil: Foreign	Unfinished oils rerun	Natural gasoline	Total Input (bbls.)
East Coast	9,656,000	5,588,000	1,191,000	234,000	16,669,000
Appalachian	2,767,000	.....	174,000	46,000	2,987,000
Indiana, Illinois, Kentucky, etc.	10,354,000	.....	842,000	210,000	11,436,000
Oklahoma, Kansas, Missouri	10,318,000	.....	500,000	427,000	11,245,000
Texas	14,506,000	338,000	889,000	808,000	16,541,000
Louisiana and Arkansas	5,755,000	364,000	482,000	579,000	7,180,000
Rocky Mountain	2,253,000	.....	696,000	130,000	3,079,000
California	22,034,000	.....	*1,133,000	†1,731,000	24,908,000
Total United States	80,443,000	6,290,000	5,937,000	4,225,000	96,895,000
Daily average, 8/29	2,594,900	202,900	191,500	136,300	3,125,600
Daily average, 7/29	2,564,700	206,900	147,600	122,700	3,041,900
Texas Gulf Coast	12,198,000	348,000	728,000	601,000	13,869,000
Louisiana Gulf Coast	3,700,000	364,000	149,000	433,000	4,646,000

Output—	Gasoline (bbls.)	Kerosene (bbls.)	Gas oil and fuel oil (bbls.)	Lubricants (bbls.)	Wax (lbs.)
East Coast	5,001,000	758,000	7,443,000	1,037,000	23,158,000
Appalachian	1,294,000	323,000	516,000	478,000	8,755,000
Indiana, Illinois, Kentucky, etc.	6,097,000	454,000	3,342,000	336,000	4,859,000
Oklahoma, Kansas, Missouri	5,549,000	898,000	3,487,000	229,000	3,114,000
Texas	7,875,000	998,000	7,411,000	706,000	4,046,000
Louisiana and Arkansas	2,630,000	476,000	2,513,000	87,000	5,804,000
Rocky Mountain	1,447,000	190,000	694,000	56,000	3,641,000
California	8,617,000	974,000	13,605,000	214,000	.....
Total United States	38,510,000	5,111,000	39,011,000	3,143,000	‡53,377,000
Daily average, 8/29	1,242,200	164,900	1,258,400	101,400	1,721,800
Daily average, 7/29	1,221,100	142,100	1,225,200	94,700	1,489,400
Texas Gulf Coast	5,962,000	747,000	4,834,000	679,000	3,845,000
Louisiana Gulf Coast	1,903,000	424,000	1,263,000	71,000	5,804,000

Output (Continued)—	Coke (tons)	Asphalt (tons)	Other finished products (Bbls.)	Unfinished products (Bbls.)	Shortage (Bbls.)
East Coast	17,300	180,300	138,000	359,000	774,000
Appalachian	4,500	2,300	19,000	91,000	199,000
Indiana, Illinois, Kentucky, etc.	44,400	54,600	184,000	288,000	162,000
Oklahoma, Kansas, Missouri	32,200	2,500	65,000	262,000	548,000
Texas	40,100	25,900	16,000	852,000	1,128,000
Louisiana and Arkansas	12,400	45,400	237,000	687,000	222,000
Rocky Mountain	11,900	600	38,000	478,000	85,000
California	6,100	67,100	279,000	*427,000	429,000
Total United States	‡168,900	‡378,700	976,000	3,444,000	3,545,000
Daily average, 8/29	5,400	12,200	31,500	111,100	114,400
Daily average, 7/29	5,100	12,500	35,400	115,500	107,400
Texas Gulf Coast	34,100	25,800	2,000	440,000	879,000
Louisiana Gulf Coast	12,200	40,900	230,000	376,000	76,000

*Includes 144,000 bbls. net tops produced. †Includes 425,000 bbls. run through pipe lines. ‡Wax, coke, and asphalt equivalent to 279.5 pounds per barrel and 5.16 and 5.53 bbls. per ton, respectively.

STOCKS HELD BY REFINING COMPANIES IN THE UNITED STATES, AUGUST 31, 1929

	Gasoline (Bbls.)	Kerosene (Bbls.)	Gas oil and fuel oil (Bbls.)	Lubricants (Bbls.)
East Coast	4,382,000	1,431,000	8,706,000	2,302,000
Appalachian	1,056,000	258,000	1,045,000	1,150,000
Indiana, Illinois, Kentucky, etc.	4,780,000	973,000	3,397,000	653,000
Oklahoma, Kansas, Missouri	3,257,000	568,000	5,574,000	382,000
Texas	3,864,000	1,536,000	13,150,000	1,852,000
Louisiana and Arkansas	1,761,000	723,000	6,901,000	81,000
Rocky Mountain	1,812,000	289,000	1,443,000	166,000
California	12,876,000	2,911,000	.....	862,000
Total	33,788,000	8,689,000	*39,316,000	7,478,000
Total 7/31/29	37,880,000	8,797,000	*40,075,000	7,524,000
Texas Gulf Coast	2,907,000	1,378,000	9,282,000	1,821,000
Louisiana Gulf Coast	1,447,000	702,000	4,734,000	74,000

	Wax (lbs.)	Coke (tons)	Asphalt (tons)	Other finished products (bbls.)	Unfinished oils (bbls.)
East Coast	90,278,000	18,200	94,900	127,000	8,579,000
Appalachian	21,973,000	4,600	1,500	63,000	1,424,000
Ind., Ill., Ky., etc.	13,656,000	69,300	46,900	187,000	4,133,000
Okla., Kans., Mo.	8,999,000	99,000	4,100	55,000	2,435,000
Texas	7,992,000	232,700	10,400	14,000	12,851,000
Louisiana and Arkansas	24,829,000	55,800	30,400	75,000	2,299,000
Rocky Mountain	23,151,000	101,200	7,000	42,000	1,763,000
California	.....	27,200	51,600	179,000	†9,767,000
Total	190,878,000	608,000	246,800	742,000	43,251,000
Total 7/31/29	191,298,000	563,900	243,300	733,000	42,440,000
Texas Gulf Coast	7,671,000	214,100	10,300	5,000	11,330,000
Louisiana Gulf Coast	24,829,000	55,700	24,400	71,000	1,617,000

*East of California. †Includes 2,577,000 bbls. tops.

GASOLINE PRODUCTION BY THE VARIOUS METHODS, AUGUST, 1929 (Barrels)

	Straightrun	%	Cracked	%	Natural gasoline	%	Total
East Coast	2,447,000	49	2,320,000	46	234,000	5	5,001,000
Appalachian	765,000	59	483,000	37	46,000	4	1,294,000
Ind., Ill., Ky., etc.	3,348,000	55	2,539,000	42	210,000	3	6,097,000
Okla., Kans., Mo.	3,300,000	59	1,822,000	33	427,000	8	5,549,000
Texas	4,030,000	51	3,037,000	39	808,000	10	7,875,000
Louisiana and Arkansas	1,062,000	40	989,000	38	579,000	22	2,630,000
Rocky Mountain	669,000	46	648,000	45	130,000	9	1,447,000
California	5,844,000	68	982,000	11	*1,791,000	21	8,617,000
Total	21,465,000	56	12,820,000	33	4,225,000	11	38,510,000
Total July, 1929	21,749,000	57	12,301,000	33	3,805,000	10	37,855,000
Total Jan.-Aug., 1929	163,291,000	58	90,810,000	32	28,842,000	10	282,943,000
Total July, 1928	19,952,000	59	11,028,000	32	2,957,000	9	33,937,000
Gulf Coasts	3,420,000	44	3,411,000	43	1,034,000	13	7,865,000

*Includes 425,000 bbls. run through pipe lines.

INDICATED DELIVERIES OF CRUDE PETROLEUM, EXCLUSIVE OF CALIFORNIA GRADES, TO DOMESTIC CONSUMERS (Barrels)

	Aug., 1929		July, 1929		Jan.-Aug.,	Jan.-Aug.,
Domestic petroleum by fields of origin:	Total	Dy.av.	Total	Dy. av.	1929	1928*
Appalachian	2,915,000	94,000	3,066,000	98,900	21,893,000	21,350,000
Lima-Indiana	249,000	8,000	203,000	6,500	1,590,000	950,000
Michigan	650,000	21,000	623,000	20,100	2,574,000	326,000
Illinois and S. W. Indiana	662,000	21,400	883,000	28,500	5,591,000	5,258,000
Mid-Continent	48,971,000	1,579,700	49,392,000	1,593,300	380,751,000	345,507,000
Gulf Coast	4,879,000	157,400	4,675,000	150,800	33,399,000	30,979,000
Rocky Mountain	2,226,000	71,800	2,250,000	72,600	18,269,000	20,213,000
Deliveries and exports	60,552,000	1,953,300	61,092,000	1,970,700	463,767,000	424,583,000
Deliveries	58,925,000	1,900,800	58,703,000	1,893,700	452,222,000	416,181,000
Foreign petroleum	5,856,000	188,900	6,114,000	197,200	55,867,000	52,208,000
Deliveries of domestic and foreign petroleum	64,781,000	2,089,700	64,817,000	2,090,900	508,089,000	468,389,000

*Final figures.

COMPARATIVE ANALYSES (THOUSANDS OF BARRELS OF 42 U. S. GALLONS)

		Runs to stills		Imports*		Exports*			Dom. demand	
			Dly.		Dly.		Dly.	Stks end		Dly.
Crude Petroleum—		Total	av.	Total	av.	Total	av.	of period	Total	av.
August,	1929	86,733	2,798	5,800	187	2,236	72	†424,362	.....	....
July,	1929	85,919	2,772	6,122	197	3,117	101	†417,773	.....	....
Jan.-Aug.,	1929	653,495	2,689	55,774	230	16,848	69	†424,362	.....	....
August,	1928	81,581	2,632	6,141	198	1,883	61	†387,017	.....	....
Jan.-Aug.,	1928	597,069	2,447	52,210	214	12,225	50	†387,017	.....	....
		Production—								
Gasoline—		Total	Dly av.							
August,	1929	38,510	1,242	792	26	5,635	182	33,788	37,759	1,218
July,	1929	37,855	1,221	934	30	6,049	195	37,880	36,860	1,189
Jan.-Aug.,	1929	282,943	1,164	5,241	22	40,671	167	33,788	246,791	1,016
August,	1928	33,937	1,095	469	15	4,562	147	27,075	33,173	1,070
Jan.-Aug.,	1928	241,861	991	2,993	12	35,585	146	27,075	215,510	883
Kerosene—										
August,	1929	5,111	165	24	1	2,054	66	8,689	3,189	103
July,	1929	4,406	142	15	..	1,288	42	8,797	2,684	87
Jan.-Aug.,	1929	37,431	164	144	1	13,660	56	8,689	24,227	100
August,	1928	5,339	172	2	..	1,678	54	8,887	3,246	105
Jan.-Aug.,	1928	39,545	162	127	1	14,862	61	8,887	23,638	97
Gas Oil and Fuel Oil—										
August,	1929	39,011	1,258	2,589	84	3,579	115	‡147,678	.....	....
July,	1929	37,980	1,225	2,206	71	3,531	114	‡145,721	.....	....
Jan.-Aug.,	1929	299,057	1,231	12,163	50	25,571	105	‡147,678	.....	....
August,	1928	37,517	1,210	515	17	3,415	110	‡134,293	.....	....
Jan.-Aug.,	1928	279,740	1,146	5,494	23	31,214	128	‡134,293	.....	....
Lubricants—										
August,	1929	3,143	101	5	..	926	30	7,478	2,268	73
July,	1929	2,936	95	4	..	1,118	36	7,524	2,167	70
Jan.-Aug.,	1929	23,302	96	29	..	7,695	32	7,478	16,498	68
August,	1928	2,891	93	1	..	813	26	7,711	2,035	66
Jan.-Aug.,	1928	23,105	95	8	..	7,704	32	7,711	15,558	64
Wax (Thousands of pounds)—										
August,	1929	53,377	1,722	5,433	175	28,114	907	190,878	31,116	1,004
July,	1929	46,171	1,489	4,606	149	24,445	789	191,298	23,798	768
Jan.-Aug.,	1929	425,305	1,767	27,214	112	194,422	800	190,878	181,563	747
August,	1928	54,429	1,756	2,793	90	31,446	1,014	79,622	30,630	988
Jan.-Aug.,	1928	413,820	1,696	15,798	65	287,513	1,178	79,622	213,121	873

*From Bureau of Foreign and Domestic Commerce, subject to revision. Exports include shipments to Alaska, Hawaii, and Porto Rico. †Includes California light crude. ‡Includes California heavy crude and fuel oil.

PRODUCTION OF CRUDE PETROLEUM BY FIELDS AND STATES WITH CLASSIFICATION BY GRAVITY (Barrels of 42 U. S. gallons)

	August, 1929		July, 1929		Jan.-Aug.	Jan.-Aug.
FIELD:	Total	Dy. av.	Total	Dy. av.	1929	1928*
Appalachian	2,914,000	94,000	3,021,000	97,500	21,762,000	20,696,000
Lima-Indiana	164,000	5,000	165,000	5,300	1,065,000	1,161,000
Michigan	650,000	21,000	623,000	20,100	2,574,000	325,000
Illinois-S. W. Indiana	645,000	20,800	630,000	20,300	4,822,000	4,993,000
Mid-Continent	53,549,000	1,727,300	53,319,000	1,720,000	393,058,000	359,951,000
Gulf Coast	4,780,000	154,200	4,505,000	145,300	35,201,000	30,809,000
Rocky Mountain	2,363,000	76,200	2,267,000	73,100	17,238,000	†19,540,000
California	27,233,000	878,500	26,797,000	864,400	196,015,000	152,148,000
United States total	92,288,000	2,977,000	91,327,000	2,946,000	671,730,000	589,623,000
STATE:						
Arkansas	2,056,000	66,300	2,098,000	67,700	17,471,000	21,749,000
California	27,233,000	878,500	26,797,000	864,400	196,015,000	152,148,000
Colorado	189,000	6,100	215,000	6,900	1,651,000	1,896,000
Illinois	571,000	18,400	552,000	18,000	4,212,000	4,376,000
Indiana	80,000	2,600	77,000	2,500	655,000	679,000
Southwestern	74,000	2,400	71,000	2,300	610,000	617,000
Northeastern	6,000	200	6,000	200	45,000	62,000
Kansas	4,186,000	135,000	4,329,000	139,600	28,329,000	26,816,000
Kentucky	678,000	21,900	710,000	22,900	4,808,000	4,500,000
Louisiana	1,668,000	53,800	1,656,000	53,400	13,126,000	14,888,000
Gulf Coast	554,000	19,200	567,000	18,300	4,711,000	4,635,000
Rest of State	1,074,000	34,600	1,089,000	35,100	8,415,000	10,253,000
Michigan	650,000	21,000	623,000	20,100	2,574,000	325,000
Montana	265,000	8,500	264,000	8,500	2,186,000	2,705,000
New Mexico	145,000	4,700	107,000	3,500	746,000	595,000
New York	285,000	9,200	301,000	9,700	2,196,000	1,619,000
Ohio	577,000	18,600	647,000	20,900	4,497,000	4,818,000
Central and Eastern	429,000	13,800	488,000	15,800	3,477,000	3,719,000
Northwestern	148,000	4,800	159,000	5,100	1,020,000	1,099,000
Oklahoma	22,632,000	730,100	22,682,000	731,700	172,418,000	158,399,000
Osage County	.....	.....	1,283,000	41,400	.....	13,921,000
Rest of State	.....	.....	21,399,000	690,300	.....	144,478,000
Pennsylvania	1,042,000	33,600	1,037,000	33,400	7,562,000	6,590,000
Tennessee	2,000	100	2,000	100	15,000	35,000
Texas	27,787,000	896,300	27,059,000	872,900	196,915,000	168,908,000
Gulf Coast	4,186,000	135,000	3,938,000	127,000	30,490,000	26,174,000
Rest of State	23,601,000	761,300	23,121,000	745,900	166,425,000	142,734,000
West Virginia	478,000	15,400	483,000	15,600	3,704,000	3,833,000
Wyoming	1,764,000	56,900	1,681,000	54,200	12,670,000	14,339,000
Salt Creek	1,022,000	33,000	938,000	30,200	7,522,000	9,595,000
Rest of State	742,000	23,900	743,000	24,000	5,148,000	4,744,000
CLASSIFICATION BY GRAVITY (approx.):						
Light crude	83,407,000	2,690,500	82,878,000	2,673,500	605,751,000	525,877,000
Heavy crude	8,881,000	286,500	8,449,000	272,500	65,979,000	63,746,000

*Final figures. †Includes 5,000 bbls. for Alaska and Utah.

DOMESTIC EXPORTS OF PETROLEUM AND REFINED PRODUCTS

	Month of August		8 months ending August	
Petroleum—	1928	1929	1928	1929
Crude Bbls.	1,882,792	2,236,243	12,223,981	16,868,783
Crude $	2,770,944	3,425,767	17,050,640	23,498,898
Total refined petroleum Bbls.	9,903,657	11,642,533	86,412,655	84,273,666
Total refined petroleum $	38,985,032	44,272,092	307,808,562	332,574,005
Gasoline, naphtha and other light products Bbls.	4,452,161	5,508,965	34,855,605	39,787,641
Gasoline, naphtha and other light products $	20,942,650	24,058,962	149,076,492	178,218,211
Oils, illuminating Bbls.	1,652,525	2,033,538	14,719,198	13,503,762
Oils, illuminating $	6,921,471	8,343,948	61,884,940	57,614,625
Gas and fuel Bbls.	2,988,277	3,177,174	29,163,419	23,384,492
Gas and fuel $	3,335,761	3,224,358	32,508,533	24,419,658
Lubricating Bbls.	796,164	913,298	7,564,086	7,469,694
Lubricating $	7,624,688	8,519,484	62,972,544	70,514,954
Other refined petroleum Bbls.	14,530	9,558	110,347	128,167
Other refined petroleum $	160,462	125,340	1,366,053	1,806,557
Paraffin wax Lbs.	31,431,104	28,110,342	287,476,830	195,068,723
Paraffin wax $	1,430,272	1,094,662	11,569,332	9,159,700

LANSING, MICHIGAN, U. S. A.

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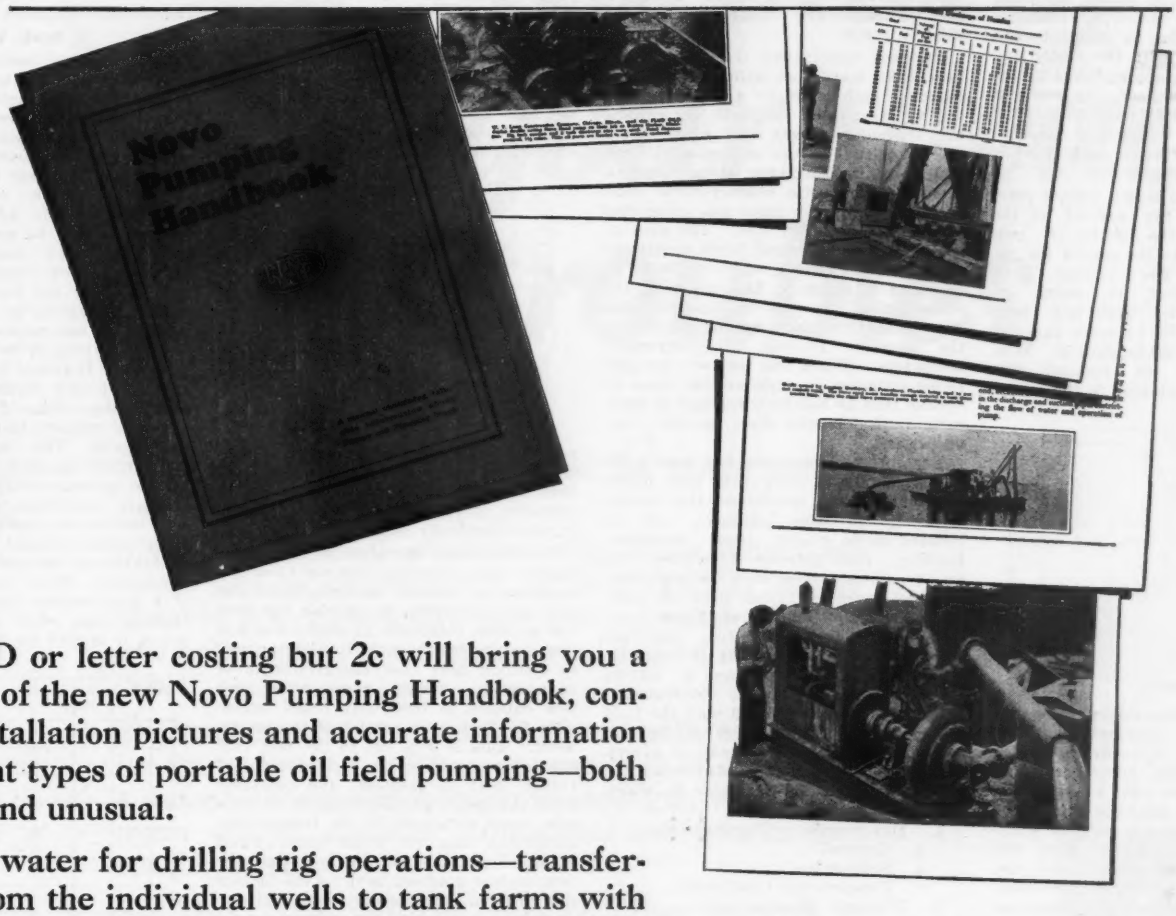

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Magnetometer Practice in the Field

Causes for Nonuniformity of Results Analyzed. Errors Associated With the Field Measurements

By William M. Barret

When the magnetometer became associated with petroleum geology in the United States, some four years ago, the oil fraternity welcomed it with open arms. As a potential benefactor its popularity grew with the major operating companies, private concerns and individuals. Contrasting its simplicity and inherent portability with the costly and laborious work being accomplished by the other geophysical methods, the geologist perceived its potential possibilities and today close to three hundred of these instruments are in use in this country while the demand still continues.

What has been the result, from a practical standpoint, of the arrival of the magnetometer into the realm of geophysics as applied to the search for petroleum deposits? The results have been decidedly varied. In many instances the magnetic work has been most gratifying, while in other cases it has proven equally disappointing. Why this non-uniformity of results? Are certain areas more adapted to the use of

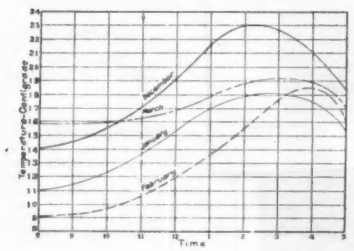

Figure 1.

the magnetometer than others? Are the secrets of magnetic interpretation intelligently understood by only a chosen few? We may, with assurance, state that certain areas are more adapted than others to the use of magnetic exploration by virtue of the simpler correlation existing betwen the magnetometer data and the hidden geologic features, and also because certain areas show relatively large magnetic anomalies while others apparently have little influence upon the magnetometer. We may, with equal assurance, venture the statement that skill and experience, in analyzing magnetic data, will not alone bring success. The accuracy of the field observations constitute a vital factor in the equation; the final interpretation can be no more correct than the data upon which it is based.

Errors in Field Observations

An abundance of technical data has appeared, in various forms, concerning the magnetometer, while the problem of magnetic interpretation has received some attention. Is it not a fact that in our effort to probe the secrets of magnetometric work we have, to a degree, ignored the less fascinating, though by no means less important phase of the undertaking which involves the field determinations? It is my sincere belief that many of the failures, attributed to the magnetometer, may be directly traced to errors in field observations. As an illustration of the importance of the field work I will mention an example that was brought to my attention recently. A certain producing oil field offered splendid opportunities for checking with the magnetometer on account of its characteristic geologic features. Many operating companies collected magnetic data, associated with this field, with the hope of enlarging their general fund of geophysical information. During the past year it has been my privilege to see three vertical intensity charts covering this area. In each case the element of neatness was apparent, while each further testified to the abundance of conscientious effort involved in its preparation. Comparison of the maps was facilitated by the fact that each magnetometer party had followed similar traverses, due to the fortunate and symmetrical arrangement of the existing roads.

On close examination the disparity between the maps was astonishing. After reducing each chart to a common base and applying equal regional corrections the dissimilarity was only exaggerated. The magnitude of the anomalies differed materially in the three cases, while a prominent magnetic characteristic indicated on one of the maps was altogether missing on the other two. The axes of a magnetic low checked fairly accurately on two of the charts, while the third illustrated a magnetic high covering the same region. It was subsequently discovered that this high was occasioned by the operator reading his instrument backwards. When this fact was brought to his attention he explained the error by stating that he had been engaged in magnetic work for only three months. Let us proceed.

The foregoing example has been mentioned merely to show that even under apparently ideal conditions the resutls obtained, in some instances, are so vitiated as to render them worthless. Luckily, such extreme differences between various surveys over the same area are the exception rather than the rule.

Principal Sources of Error

We may group the two principal sources of errors, occurring in magnetic exploration work, as follows: 1. Errors of interpretation; and 2, observational errors, or errors associated with the field measurements. This article will be concerned with this latter group of errors. We may briefly summarize as follows, the various headings in the order in which they will be discussed:

1. Magnetometer Characteristics:
   a. General.
   b. Scale-value.
   c. Temperature Coefficient.
2. Distance Measurements.
3. Location of Stations.
4. Instrument Set Up.
5. Corrections.
6. Computation of Data.
7. Miscellaneous.

Magnetometer Characteristics

General—The major portion of the magnetometer work, associated with the oil and gas industry, is being done with the Askania vertical and horizontal field balances, the horizontal instrument being used to only a limited extent at the present time. Consequently, the following matter will refer specifically to the Askania vertical balance.

It is well for the magnetometer operator constantly to bear in mind that the degree of success which he attains in the field is directly related to the care and attention which his instrument receives. The field balance has been admirably designed to withstand the ordinary abuses associated with intelligent field work, but like all instruments of precision it refuses to function properly when carelessly handled.

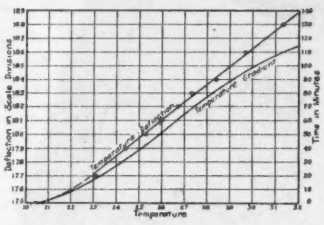

Figure 2.

For the proper operation of the magnetometer it is essential that we know accurately its various characteristics. Before the instrument is suitable for field use we must determine its scale-value and temperature coefficient. It might be well to mention here that the certificate of examination, which accompanies each new balance, is frequently found impossible to check upon receipt of the instrument. This is due, not to the fact that the factory calibration is in error, but rather, that in shipment the constants have changed. The discrepancy is, as a rule, more noticeable in the temperature coefficient than the scale value, which is, no doubt, due to the fact that the temperature gradient used for the factory test differed considerably from that employed for rechecking the instrument.

The matter of latitude adjustment of the variometer is so simple as to require no special attention, sufficient to say, that the instrument should be so adjusted that it will read approximately +20, without the use of auxiliary control magnets, under the influence of the average magnetic intensity obtaining within the general area under survey. Whenever the latitude adjustment of the instrument is disturbed, it is advisable to recheck the magnetometer constants, particularly, the temperature coefficient.

Scale Value

Two principal methods are used to determine the scale value of the vertical variometer, each method possessing certain advantages as well as disadvantages. Helmholtz coils, supplied with direct current, may be employed or we may make use of the magnets furnished with the instrument. Both arrangements have been described in previous publications so that it will be unnecessary to enter into a detailed description of either. However, a few remarks regarding both methods may not prove undesirable.

Standardization by means of auxiliary magnets is the method used most extensively, by virtue of its simplicity and convenience. It should be remembered, however, that this method presupposes an accurate knowledge of the moments of the auxiliary magnets in order to obtain precise results. The magnets should be standardized as often as it is deemed advisable, perhaps every six months under ordinary conditions, and should not be subjected to the shocks of transportation except when required for the purposes of calibration or increasing the range of the instrument. Since the magnetic moment of a new magnet undergoes more rapid changes than after it has become seasoned, it is well to observe carefully the

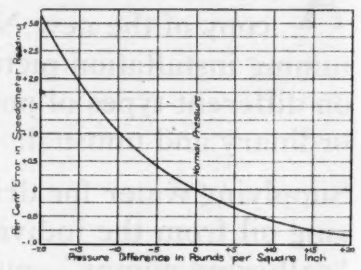

Figure 3.

behavior of the auxiliary magnets for a time after their receipt from the factory. These magnets may be readily checked by means of a standard magnet, of known moment, employing the method mentioned in Dr. Heiland's publication "Theory of Adolf Schmidt's Horizontal Field Balance." When the magnets are not required, for use with the instrument, it is well to place them, north end down, in a location free from vibration.

Scale Value and Reading

Before determining the scale value of a new instrument it is advisable to study the influence of the shape of the knife edge on the scale value at different parts of the scale. For this purpose we may plot a curve representing the relation between scale value and reading. This curve will, in all probability, indicate the possibility of employing an average value for the scale value, which may be obtained in the ordinary manner, deflections being observed twice, in at least four distances, using each auxiliary magnet, in connection with the deflection tube and computing the scale value from the arithmetical mean of all the readings. Should the results obtained from the large and small deflectors be appreciably different, it will probably be advisable to give preference to those of the large deflector. The truth of this statement is corroborated by recent studies of the United States Coast and Geodetic

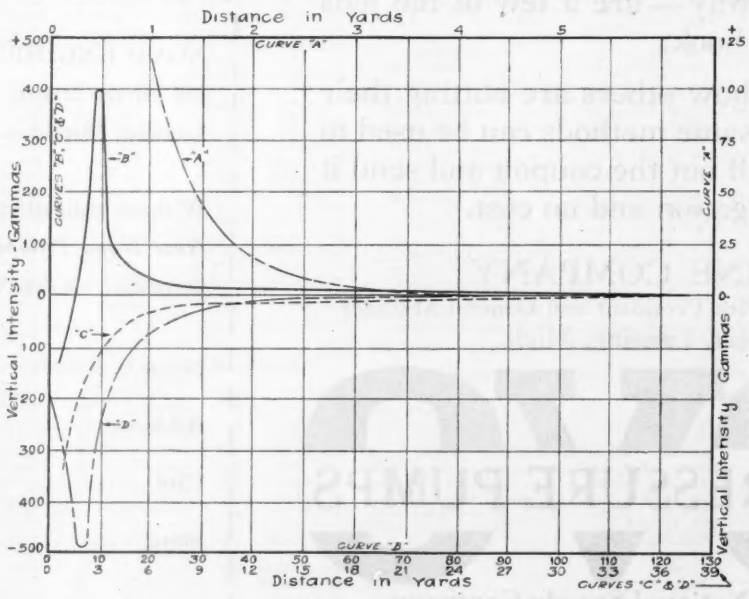

Figure 4.

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Survey, their results indicating the desirability of large deflectors, placed at relatively great distances from the variometer, which arrangement tends to materially reduce the distribution factor, since the magnetic field produced by a bar magnet becomes more uniform as the deflection distance increases. A further advantage is that with the greater deflection distances employed the relative error in determining the deflection distance is reduced. The scale value determinations should be carried out under a constant temperature.

While Helmholtz coils, properly designed and constructed, perhaps furnish the most accurate means for exact determinations, nevertheless, they lack the element of portability inherent with auxiliary magnets and are also difficult to properly attach to the magnetometer since no provision is made for their use by the manufacturer at the present time.

Field Intensity

The field intensity, at the center of the coils, is proportional to KI, where K represents a constant depending upon the physical dimensions of the coils and the number of turns, and I is the current. The potentiometer and standard cell provides the most accurate method for measuring the value of the current, though the arrangement may be satisfactorily replaced by dry cells and a reliable milliammeter, together with coarse and fine rheostats for varying the value of the

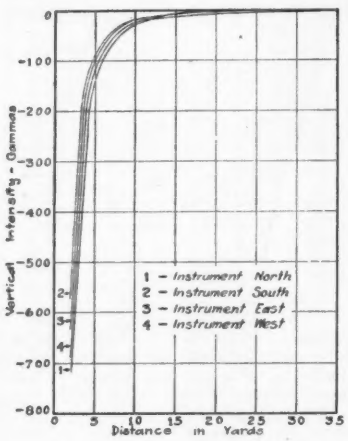

Figure 5.

calibrating current. Milliammeters, of the electrodynamometer type, may be obtained with a guaranteed accuracy of one-quarter of one per cent of full scale value on the working part of the scale, which falls well within the limits of allowable errors.

For standardizing the balance with Helmholtz coils the calibrating current should be varied in increments, noting the deflection of the magnetometer for each value of the current. The zero reading should be observed after each increase or decrease in current and the deflection computed from the algebraic difference between the deflection and the succeeding zero reading. A curve should be constructed representing the relation between the field intensity and the deflection, or since the field intensity is directly proportional to the magnetizing current, we may use the value of the current instead of the field intensity. As before, the curve will probably not prove to be a straight line, in which event the most uniform portion should be selected. By virtue of the thermal effect of the magnetic system of the magnetometer the temperature should remain constant during the series of observations, temperature effects on the Helmholtz coils being negligible if the current is measured by either of the two methods mentioned above.

To meet average requirements the scale value of the vertical balance should be fixed between 20 and 30 gammas, thus permitting measurements of the vertical intensity with an optical accuracy of plus or minus 2 to 3 gammas.

As in the case of scale value determinations, much has been written regarding the proper methods to use in finding the temperature coefficient. However, since inaccuracies in this coefficient constitute perhaps the greatest instrumental error with which the operator has to contend, it might be well to refer briefly to its determination.

In the practical application of the field balance the temperature coefficient is considered a constant, though unfortunately, this is not strictly true. The variation of this coefficient is due, in part, to the shape of the knife edge, as well as the effect of thermal lag on the magnetic system. While we can do little to correct the relatively small error introduced by a particular knife edge, nevertheless, the effect of thermal lag can be more effectively dealt with. This latter effect is closely associated with the rate of change of the temperature, or the temperature gradient. Since we have little control over the temperature gradients occurring in actual field work, it follows, that to correctly compensate the instrument against these unwelcome temperature effects we must, as nearly as possible, reproduce in our temperature calibrations approximately those gradients encountered in the field.

Temperature Time Curves

The magnitude of these gradients is, in a sense, correlated with the seasons of the year. With this in mind we may, with the aid of the temperature and time records taken from the field data book, determine the average gradient for several weeks prior to the time of rechecking the temperature coefficient of the instrument, and with this information, duplicate, as nearly as is practicable, this same average gradient in our temperature calibration. The merit of this method will be doubted when it is considered that the slope of the temperature-time curve will perhaps exhibit marked differences from day to day. However, it is surprising how uniform these curves become when the plotted values of instrument temperature are averaged over a period of time. In Figure 1 are shown temperature-time curves, covering the months of December, 1928,. and January, February and March of 1929, prepared from readings recorded, under actual field conditions, on approximately 80 per cent of the days during the months mentioned, the data being secured from field observations in northwest Louisiana.

From an inspection of these curves it will be readily apparent that the gradients obtaining during the winter months of December, January and February are strikingly similar, the contrast in March being somewhat more pronounced. Each curve shows a well defined peak occurring between the hours of 2 and 4 in the afternoon, after which the temperature drops rapidly. This abrupt fall in temperature is significant since it forecasts the hazards attending the common practice of rechecking the base position, late in the afternoon, after completing the day's work

Undoubtedly a more accurate method would be to check the temperature coefficient with several temperature gradients, and then, by plotting, after each day's observations, a temperature-time curve, determine the correct coefficient from the calibration curve most nearly corresponding to the temperature changes occurring at the time the field readings were recorded. Unfortunately, this procedure is somewhat tedious, and since the work involved in computing the field data is already laborious, it is doubtful if this additional time would be merited except in cases where an abnormally large temperature coefficient prevailed.

Varying the Temperature

For checking the temperature coefficient various methods are employed to vary the temperature of the instrument. The electric heating box, using a non-inductive, alternating current heating element may be used to advantage, since the temperature may be regulated by means of a rheostat in the circuit. Also, a small room artificially heated and free from vibration and stray magnetic effects serves the purpose excellently. Many operators make use of the natural variation in air temperature to furnish the means for determining the thermal effect, though this is not recommended, since as a rule in such cases, no accurate method is available to record the diurnal variation and the error introduced from this source may become appreciable. In any event, should we attempt to determine the temperature coefficient, without the aid of a second instrument, kept at constant temperature and used to measure the diurnal variation effect, it is well to take two series of observations,

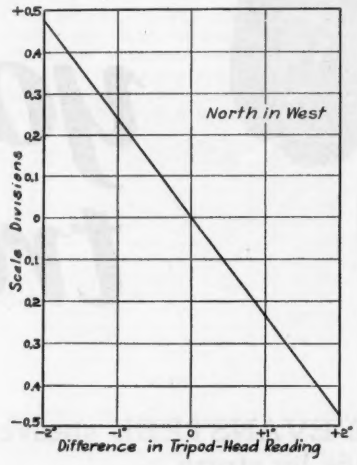

Figure 6.

one in the morning and another in the afternoon, using the average value of the coefficient thus found. In this manner it is probable that the diurnal effects will be reduced.

In Figure 2 is shown a typical temperature deflection curve obtained with a vertical balance having a scale value of 24.8 gammas. The temperature coefficient was found to be +0.13 scale division or +3.2 gammas; the temperature gradient being approximately 5 degrees Centigrade per hour, ascending. The instrument thus has a negative temperature correction of −3.2 gammas per degree Centigrade. At the beginning of a heat run of this character it will be noticed that the plotted points of the temperature deflection curve are not uniform due to the thermal lag of the magnetic system. Also, as a rule, the points will become scattered as the slope of the temperature gradient curve decreases toward the end of the test. Since, for convenience, we generally consider the temperature correction a constant, it follows that the correction will be represented by a straight line passing through the most uniform portion of the plotted values.

The operator should bear in mind at all times that the greater the temperature correction of his instrument, the more care he should exercise in intelligently understanding its thermal characteristics. If the correction is abnormally large it will be very difficult to regularly accomplish good results in the field and an effort should be made to reduce the coefficient. As a rule, this is a matter that requires a thorough understanding of the instrument and should only be attempted by a skilled technician in a geophysical laboratory.

Distance Measurements

One of the greatest field problems confronting the magnetometer operator is that of correctly locating his stations upon the map, since a variation in this regard will produce an error both in the regional corrections applied as well as rendering a false representation of the geologic conditions existing at the station. Some of the larger companies employ surveying parties to locate position of the required station before the instrument crew are sent into the field, though, as a rule, this procedure is restricted to geophysical methods other than magnetic. Generally speaking, the magnetometer party must depend upon their own devices for their proper locations.

In some states this problem is greatly simplified by the symmetrical arrangement of roads, though this is the exception rather than the rule. It will often be found possible to secure accurate road maps from the various county or parish engineers at very nominal sums which will not only tend to speed up the work but will render it more exact. Particular emphasis has been placed upon the matter of roads for the reason that most of the magnetic surveys, especially as regards reconnaissance work, require automobiles for transportation. When these road maps are not available, or when it is impractical to use cars within the area under survey, we must resort to other methods to secure our correct positions. Perhaps the Brunton Pocket Transit provides the most convenient means to establish our locations under such conditions. By employing this instrument the operator may, with care and practice, determine very accurately his horizontal angles, the corresponding distances being measured by the speedometer, if an automobile is used, or with a pedometer, if the work is being done on foot.

It is important to remember that when employing any type of compass, for measuring the horizontal angles of a traverse, it is necessary to compensate for the variation between true and magnetic bearings. With the Brunton compass this correction is simplified since the instrument will read true bearings direct, after the outer dial is rotated through an angle equal to the magnetic declination. A simple rule for setting off the declination on the Brunton compass may not be out

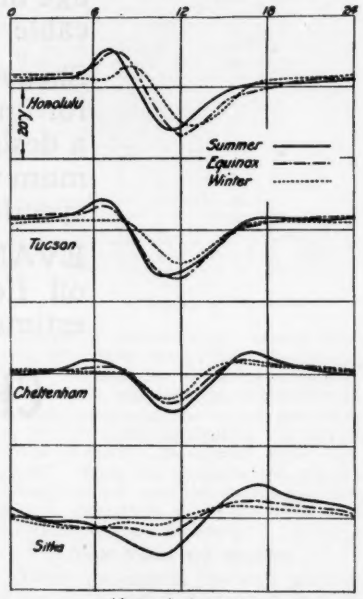

Figure 7.

of place. After determining the angle of declination from a Government chart, for the region under survey, the outer dial is turned through the same angle, eastward if true north is to the west of magnetic north, and westward if true north is to the east of magnetic north.

Line of Travel

By using the township range plat, the line of travel may be recorded as the work progresses. The angles, as read from the compass, are drawn on the plat with the assistance of a protractor, while the distances are measured with a finely divided rule, the scale of which is the same as that of the plat. If the scale of the plat is one inch to the mile, as is customarily the case, we may obtain

(Continued on Page 245)

MAGNETOMETER DATA SHEET No._____

No.	Time	Tripod Index	Temp	dT	adT	DEFLECTIONS N — W	DEFLECTIONS N — E	DEFLECTIONS Avg.	dX	ΣdX	dz'	D.V	dz'	Rep.	DE	Rec DE

Figure 8.

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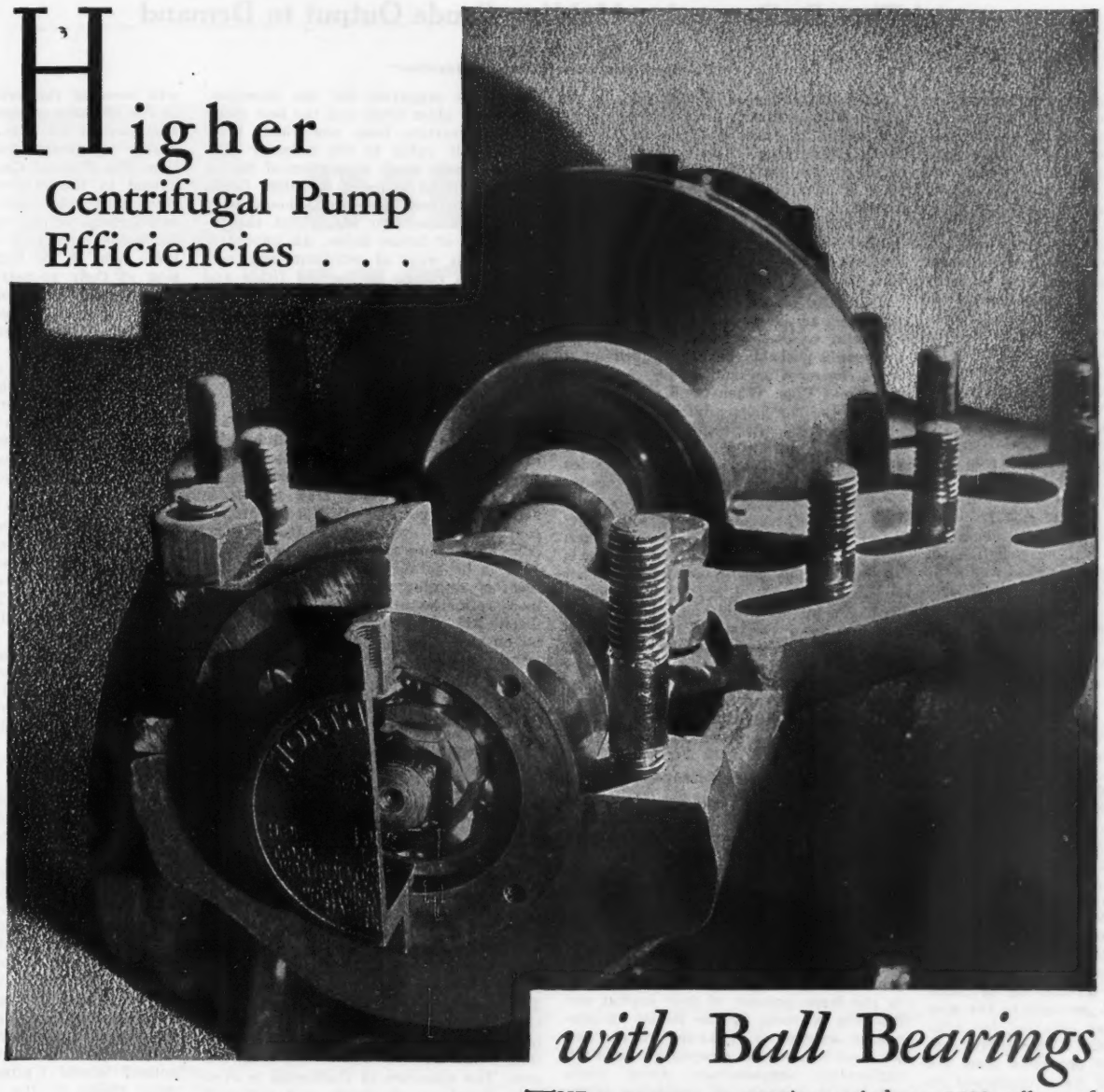

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WORTHINGTON

Engineers Should Work On Officials

Reeser Suggests Moratorium on Engineering Field Work and Time Be Devoted to Holding Crude Output to Demand

By E. B. Reeser
President, American Petroleum Institute*

It would be proper on this occasion to have a huge birthday cake with many candles sending cheer to those surrounding it. Three score and 10 years ago this great petroleum industry put on swaddling clothes and started on its career, which has reached the uttermost parts of the earth.

Colonel Drake and the hardy pioneers of 70 years ago were the first engineers to engage in the business. Like so many leaders in all the great movements of time, Colonel Drake was born on a farm. His first visit to Titusville was for the purpose of "examining a prospect." He believed that the oil seepage, which had aroused the curiosity of the natives, had its fountainhead deep in the earth and that, if possible to drill through the rock, a greater quantity of oil could be obtained. The drill did penetrate the rock and, thus, the first producing well was a realization of the continued ambition for "deeper drilling." It is interesting to note that while petroleum geologists were unknown at the time of the discovery of the Drake well, the colonel, nevertheless, studied the formation and relied on geology as much as do the great geologists of today. It is also interesting to recall the fact that with only one well on production the United States suffered from overproduction.

More Oil, Less Money

The petroleum industry developed with amazing rapidity from the very beginning. In the tenth year the production had reached 4,215,000 bbls. with a value at the wells of $23,730,000. Five years later, in 1874, with a production of 11,000,000 bbls., the value at the wells had been reduced to $12,648,000. Please note that in these early days net results were not realized by greater volume. This was further shown in 1882 when the production reached 30,000,000 bbls. and was sold for almost identically the same amount which was obtained for 4,000,000 bbls. in 1869. The production in 1928, of 900,000,000 bbls., brought to the producers less than was obtained for 440,000,000 bbls. in 1920. Competitive conditions governed the operators from the very beginning and have continued to the present time.

The rapid development of the known oil pools continued without any interruption from 1859 to 1887. Just prior to the latter year the industry became demoralized because of the inability of producers to sell their production. "Shutdown" movements were started which resulted in a decrease in drilling operations and a decline in completion of wells from 3,583 in 1886 to 1,981 in 1887. The producers also voluntarily agreed to shut in one-third of their production. This movement continued for six months, at the end of which time the purchasing companies changed their policies, whereupon the operators resumed at top speed the drilling of wells. This was the only successful shutdown plan until recent years.

The industry expanded and prospered during the first 50 years of its existence with very little scientific or engineering skill. The wells were comparatively shallow and the cost relatively small.

Growth of Engineering

Petroleum engineering, as we now understand it, is a very recent development. The earliest use of this phase came from England. It is probable that the first organized petroleum engineering work in the United States was in connection with the gas conservation efforts in the Cushing Field.

The University of Pittsburgh, in or about 1918, seems to have been the first institution to grant a degree in "Petroleum Engineering." Ten universities are offering this course at the present time and, while there are probably several thousand engaged in the oil industry who are well qualified to operate under such a classification, the actual degree of "Petroleum Engineer" has been conferred on not to exceed 100 men.

Scientific theories and ideas are only beginning to show what can be done by operating on such a basis. The old methods would probably have continued for a much longer time had it not been for the Great War. When the United States entered the European conflict, statesmanship developed within the ranks of the industry, resulting in the formation of the "National Petroleum War Service Committee." Every section of the country and every phase of the industry from the manufacturer of supplies to the delivery of the finished petroleum product, was regulated under the direction of this committee. The record attained through meeting the demand of the Government with an ample supply of an essential product on a reasonable price basis is one of which the industry may well be proud. At the conclusion of the war, the need for a national association was so obvious that the American Petroleum Institute was formed, since which time great progress has been made in many directions.

Science Aids Discovery

Through the intelligent use of geology, aided by the various scientific devices, new sources of petroleum have been discovered at frequent intervals. It is, however, apparent that the proportion of dry holes drilled throughout the nation has increased tremendously within the last 10 years. In 1928, 31.7 per cent of the wells were dry as compared with 20.5 per cent in 1919. A careful analysis will probably show that the increase was due to the large amount of new capital put into the business by the public on promotion schemes of all kinds. All the major and semimajor companies maintain exploratory organizations which reach out far in advance of producing areas. Large areas of prospective territory are leased and then it is decided to be cheaper to drill than to pay rentals—this, too, accounts for many dry holes.

One of the greatest steps of advance made in the industry has been through the standardization of tubular goods and other materials and supplies needed for the deeper and deeper wells which are being drilled. Because of the work of the standardization committee, better materials have been demanded and obtained. This has permitted the drilling of wells to greater depths and, by so doing, the production of petroleum has grown more rapidly than the consumption. The petroleum engineers have rendered great assistance in preparing specifications for material which made this deeper drilling possible.

The tremendous increase in the number of internal combustion engines—especially in automobiles—with an ever increasing demand for gasoline, was met with quick response from the chemists and engineers in improving the refining practice to a remarkable extent. The limit of the amount of gasoline which will be obtained from a barrel of crude will be extended each year as the demand increases until probably 100 per cent of the crude will be converted into the world's greatest element of power.

Petroleum Engineers Big Factor

The work being done by petroleum engineers in preparing for the repressuring of the older fields and the best method of extracting from new fields is of incalculable value to the industry. The comparatively small proportion of the total contents of many of the older fields, which have been recovered, should be a lesson to those who will direct the development of future fields. An important part of the work of petroleum engineers will be to return to the old fields and develop ways and means for retrieving as much as possible of what remains.

Those who have been instrumental in bringing the industry through these years of "ups and downs" have been gradually yielding their control and turning over the development of the properties to "petroleum engineers." It is the hope and belief that these specialists will be able to produce greater results than under the more or less "happy-go-lucky" methods of the older times. How can these hopes be best realized? Will it be through continued and even greater efforts to increase the production of crude petroleum? Will it be through the further development of refining practice or by building more refineries and a greater number of distributing stations? Experience shouts its answer—"No! No! Let us cease our efforts in that direction." It has been shown conclusively that increased production does not yield increased revenue. Efficiency is not worth talking about unless it brings better results.

Petroleum is a peculiar product. You are all so well acquainted with its character that nothing need be said on the subject. Competition has, in the past, made it practically impossible to balance supply with demand. The period is rapidly approaching—if not already here—when the question of competition will be reduced to the major or semimajor companies. During the first six months of 1929, the production of 20 companies operating in Oklahoma was approximately 58 per cent, while 1,378 other companies and individuals produced 42 per cent. The record in Texas shows that during the same period 27 companies produced nearly 75 per cent of the total production, while 1,258 others produced 25 per cent. The situation in California is even more largely in the hands of a few than in the two States referred to.

Hold Output to Demand

It should be the ambition of executives and engineers of producing companies to gradually reduce the total output of petroleum to less than the current demand. The conservation of this great national resource is important. In fact, the future safety of the nation may depend on what is done during the next few years toward the proper utilization of petroleum. The reduction in production as suggested should be on a basis which would require a reasonable withdrawal from our excessive stocks of petroleum and its products. This would bring about greater efforts in the refining division to increase the recovery of gasoline and decrease the volume of fuel oils which are now being forced on the market at ridiculously low prices. This, in turn, has helped to demoralize the coal industry. The end of 1929 will show approximately 700,000,000 bbls. of crude and refined products in storage—truly a staggering load for the industry to carry. These stocks should be reduced 50 per cent. The responsibility of correcting the present conditions of the industry will, to a large extent, rest on your shoulders. A great opportunity presents itself at this time to make the seventieth birthday of the industry the beginning of a new era.

I am not advocating or suggesting that conditions should be brought about which will increase the price of our products to the ultimate consumer to an unreasonable extent; but I do believe that the industry is entitled to proper remuneration. The Federal Government has guaranteed to the railroads of the country rates that will yield a substantial and satisfactory return on their valuation. Railroads are very properly applying large sums to the betterment and expansion of their properties. Instead of depleting, they are constantly increasing their holdings. The petroleum industry is depleting its resources at a tremenduous rate and while doing so, it is not realizing a proper return on the total investment or valuation. The future prosperity of the industry depends, in my opinion, on the attitude which you may take after you leave this meeting. Will it be more oil and lower earnings, or proper production with a proper financial result?

Moratorium Suggested

There are those who hold up their hands with fear that any attempt to slow up production would bring the Department of Justice on them in a very unfriendly manner. The Sherman antitrust law was passed 39 years ago—big business and mergers were developing too fast to suit the congressmen. They attempted to, and probably did, strengthen it in 1914 through the adoption of the Clayton Act. It is not for us to criticise or question the wisdom of this legislation. The nation has prospered under it. The only exceptions to which it applies are those which are subject to government regulation. Many believe all natural resources should be exempted. In my opinion, such exemption will never be realized unless we accept Federal regulation. Very few admit that a hazardous enterprise such as the petroleum industry could prosper, or even function properly, under such direction. Fortunately, the petroleum industry does not need, and will not ask for, Federal regulation.

Would the anthracite coal industry be stabilized and prosperous if each company employed an engineering staff with instructions to increase production and thus reduce operating costs per ton mined? Would United States Steel and other stocks in the industry be selling at present levels if the companies operated on a maximum output basis?

It must be admitted that executives in the petroleum industry have not had the success which their individual ability would justify us in expecting—perhaps they have not had proper support from their operating and engineering departments.

As suggested heretofore, the industry at large is pointing to the petroleum engineer and expecting greater results because of his efforts. Your influence is great with the executives, directors and bankers. It is probable that if each of the members of this organization were to recommend and urge that the production of petroleum be balanced with consumption, we would quickly obtain such a result. May I suggest that you declare a moratorium for six months on all work in connection with deeper drilling, repressuring and on other plans which you have in mind, devoting all your time to the teaching of the theory that efficiency means proper financial results.

*Before the Petroleum Section, American Institute of Mining and Metallurgical Engineers, Tulsa.

JAPANESE OIL OUTPUT

Official statistics published by the Department of Commerce and Industry at Tokyo place the Japanese production of petroleum at 955,237 bbls. during the first six months of the year.

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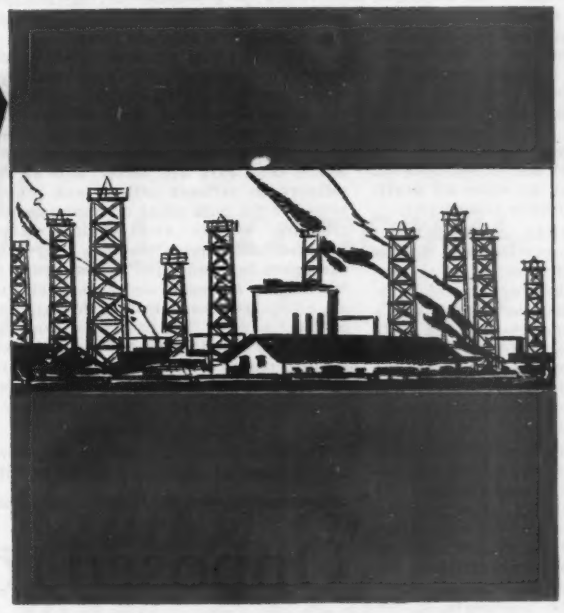

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Approve Latest Code Interpretations

Institute Directors Ratify Action of Interpretation Committee. To Require Posting of Tank Car Prices. Continue Commercial Discounts

By C. O. Willson

The board of directors of the American Petroleum Institute at a meeting in Tulsa Friday morning approved the action of the National Committee on Interpretation of the Code of Practices for Marketing Refined Petroleum Products which promulgated additional interpretations of Rules 3, 10 and 17. The board in a formal resolution also announced that the code is now in effect and called upon oil marketing companies to make all provisions of the code effective immediately.

The recommendations of the national committee on interpretations and the action of the board of directors of the Institute followed a hearing Thursday attended by representatives of the code's regional and subcommittees from all parts of the United States. At the Thursday meeting these committees reported the effective status of the code by states and also made suggestions as to changes in rules and interpretations.

The national committee of interpretations in its report to the board, did not act on all of the suggested changes. At the meeting on Thursday the committees by almost unanimous action asked that the code be changed to prohibit commercial discounts at service stations. No action was taken on this request either by the interpretation committee of the board of directors. It is understood that a majority of the national committee and board members feel that this provision of the code should not be changed at this time.

Commercial Accounts

In regard to commercial accounts, which are a part of Rule 17, an attempt was made to make the provisions clearer with additional interpretation. Relative to this provision the new interpretation says:

"Commercial accounts need not be posted when they apply only to written contracts for charge accounts for the delivery into commercial vehicles properly licensed and used for the transportation or delivery of passengers, merchandise, freight or express. Only vehicles bearing a commercial license and used in a commercial business are entitled to the commercial discount.

"In states which do not issue special licenses to commercial vehicles, a price not posted should be allowed only to such vehicles as are usually licensed under the commercial series by nearby states which do issue special licenses to commercial vehicles. Trucks, buses and taxicabs are generally regarded as being commercial vehicles. Vehicles bearing pleasure car licenses, whether operated by salesmen, executives, employes or dealers, are not entitled to the commercial discount. Any deviation from this practice requires the posting of the price."

Post Tank Car Prices

Rule 17, which also deals with posting prices, includes the posting of all classes of tank car prices according to the new interpretation of the national committee. There has been considerable agitation in the trade to confine the posting to the tank wagon and service station prices. The new interpretation, however, makes it clear that the posting rule includes tank car prices and also explains other features of the rule as follows:

"All refiners, distributors, jobbers, wholesalers and retailers are required to conspicuously post the specified price but the rule does not in any way require the price posted by any refiner, distributor, jobber, wholesaler or retailer to be the same price posted by his competitor. The rule contemplates that each one will determine for himself the prices at which he contemplates selling his products, post those prices on his premises at a place conveniently accessible during business hours to the public, and adhere to such prices until new ones are posted.

"The posting of prices under this rule means the posting of tank car prices, tank wagon prices and service station prices at the respective places from which deliveries are made. Tank car prices should be conspicuously posted at terminals where tank cars are loaded and at the refinery or refinery office. tank wagon prices at the bulk plant or wholesale distributing centers and service station prices at all service stations. By tank car prices is meant spot prices, prices at which sales are made under contract, and all allowances made from either spot or contract prices. The posting of tank car prices may be either on the basis of f.o.b. loading point, at destination, or in any other manner which will clearly set out the price actually paid by the purchaser."

Painting Stations

The other two interpretations approved by the board of directors have to do with the painting of stations and the definition of what constitutes a standard sign. The Pacific Coast regional subcommittee at the hearing Thursday requested the interpretation of Rules 3 and 10 to permit the painting of company colors on all stations where such companies are the sole suppliers of petroleum products. Some changes were made in the interpretation of these rules but the request of the California committee was not approved in its entirety.

These rules with the additional interpretations announced Friday will continue in effect until the annual meeting of the Institute which will be held in Chicago in December. At that time the board of directors will again consider the changes proposed by the California committee.

Following are the new interpretations of Rules 3 and 10:

Rule 3: "This rule does not prohibit the painting over of any sign or colors of a supplying company, not protected by contract, with a neutral color when the dealer transfers his account from the company whose sign or colors are being obliterated to another company.

"By a neutral color is meant a color not customarily used in the painting of the service stations of the company to which the account is transferred."

Rule 10: "The restriction of painting for dealers to the companies' standard signs is understood to mean the customary standard signs of the various companies with such border painting as may be necessary to give the standard sign proper display qualities; but this does not include the painting of garages, service stations or other buildings, or large wall signs or other unusual painting, although such painted matter may be the design of the company's standard sign or the company's colors.

"This is not intended to prohibit the painting of stations owned or leased by refiners, distributors, jobbers and wholesalers."

Opposed to Commercial Discounts

Code of Ethics Committee Ask That Discounts Be Prohibited at Stations. Suggest Other Changes in Interpretations

Members of regional and subcommittees in a hearing Thursday at Tulsa before the National Committee on Interpretation of the Code of Ethics went on record as opposed to the code's provision which permits commercial discounts at service stations. The action was taken at the close of an all-day session in which committee members from all parts of the United States discussed several provisions which are causing some delay in the unanimous acceptance of the code which became effective for the industry with the approval of the Federal Trade Commission on August 31.

The matter of commercial discounts has been a much discussed provision of the code from the time of its inception. The code provision which is a part of Rule 17 of Group 2 is admittedly a compromise in which an effort was made to limit the use of the discount which has always been opposed by a majority of the companies engaged in the marketing of refined petroleum products.

The action was taken on Thursday after a discussion had again emphasized the inherent evils of this particular rule with the contention that it threatened the general acceptance of the code. The motion which clearly showed the attitude of the committee membership was made by H. W. Dodge, manager of sales for the northern district of The Texas Company. Out of a total of approximately 75 voting on the motion only 2 opposed it.

The motion has no final significance so far as changing the present provision of the code is concerned. Any change would first have to receive the approval of the board of directors of the American Petroleum Institute and the Federal Trade Commission. The latter before taking action would probably hold another general hearing in order to determine the attitude of the industry.

The discussions centering around the commercial discounts and those concerned with the posting of tank car prices and painting of stations under Rule 3 were outstanding at the hearing. Several other phases of the code were discussed. In most cases the interpretation committee was able to clear up the points under discussion although several matters were taken under advisement.

Report Progress

The hearing was opened by E. B. Reeser, president of the American Petroleum Institute, who commended the work of those who have taken an active part in the promulgation of the code and are now engaged in securing its general acceptance by the marketing branch of the oil industry.

W. R. Boyd, Jr., executive vice president of the Institute, then asked for reports from subcommittees relative to the progress in the application of the code which has been effective approximately 30 days. Most of these reports were given by the chairman of the state committees.

The status of the code acceptance varied widely. Several chairmen reported a general acceptance in their states with only minor difficulties yet to iron out. In other states there has not been sufficient time to complete organization work and no effort has yet been made to make the code provisions applicable.

These reports served to air some of the difficulties that are being encountered in securing the formal acceptance of the code provisions by marketing companies. In most cases the major companies have approved the code and are making its provisions effective so far as their operations are concerned. However, it was brought out that its success in several states depends on the final attitude of two major companies which have not adopted yet the code due to their objections to one or more of its provisions. Some of the state chairmen reported that the acceptance of both large and small marketing companies was conditioned on the action of these two major companies. It was stated that it would be impossible to secure a general acceptance within their states unless these two companies altered their present position and formally ratified the code in its entirety.

Several of the committee chairmen sought additional interpretation of certain rules in order to cope with certain objections that had been made at the state meetings.

Following the progress reports of the committees the meeting was turned over to the National Committee on Interpretation of the Code. Col. H. T. Klein, general counsel of The Texas Company and chairman of the national committee presided. He was assisted in the hearing by E. S. Hall of the Standard Oil Co. of New Jersey, Roy B. Jones of the Panhandle Producing & Refining Co. and by Mr. Boyd, Jr., and other members of the committee.

Each of the rules were taken up separately and opportunity given for questions relative to interpretation of provisions. Several of the questions were taken under advisement by the interpretation committee which will make recommendations to the board of directors of the American Petroleum Institute relative to any changes or additions to the interpretations already made available to the industry.

Posting Tank Car Prices

The matter of commercial discounts was the last rule to be discussed. It is a part of Rule 17 whose primary provision requires that all prices for gasoline and kerosene for each class of delivery shall be conspicuously posted. Deviations from these posted prices by rebates, bonuses, etc., are prohibited. Commercial discounts are recognized as an exception to this rule "in sections where they are now in vogue but shall apply only to written contracts for charge accounts."

The question arose as to whether or not the posting of prices applied to tank car prices. Several of the committee members expressed the opinion that it would be impossible to enforce the rule covering tank car prices both on spot and contract sales. William A. McAfee, of the Standard Oil Co. of Ohio, in discussing this provision pointed out that in the State of Ohio the tank car price on gasoline varied in different parts of the State. In parts of the State the prevailing market in the Oklahoma (Group 3) is the determining factor; in another part of the State the Arkansas-North Louisiana price is the controlling

(Continued on Page 204)

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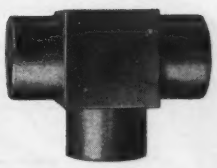

TEES

NIPPLES

ELLS

Added Importance of Richland Field

While It Is Three Years Old, It Is Just Now Facing Its Big Years of Usefulness. Enormous Gas Potentiality

By D. H. Bancroft
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., Oct. 7.—Although it is three years since the discovery well was drilled in the Richland Parish gas field, and a little more than two years since its development began, this rival to the Monroe Field, which is estimated to have a greater recovery per acre than Monroe, is just reaching the point the older field a few miles northwest attained with the coming of the carbon and natural gasoline industries in the days immediately following the war.

There being little for the geologist to work on in surveying the area, which later turned out to be a high pressure gas field, it was not regarded with much favor and the discovery well, Gulf Refining Co.'s No. 1 England Planting Co. in Section 32-17-6, was drilled against geological advice. It came in from a total depth of 2,340 feet with an estimated 10,000,000 feet at 1,108 pounds through drill stem, which was stuck when the wildcat blew in unexpectedly and was cemented in the hole. What its open flow capacity would have been is a matter of guess work. It was the eighth of a series of wildcats that had been drilled in that general area and the Gulf company's first.

Wells preceding the discovery had been drilled to the west, north and southwest, consequently the Gulf moved far to the east and drilled its second test on the Chess-Wymond Lumber Co. lease in Section 26-19-8, abandoning it is a dry hole. It was not until February, 1927, that the second producer in what was to be the field was completed, Palmer Corp.'s No. 1 Colvin in Section 33-17-6, making 20,000,000 feet from a total depth of 2,432 feet. From then on development began to slowly increase the trend being straight south and spreading over the SW Township 17, Range 6 and the W half of Township 16, Range 6. Some drilling has been done along the west line of Range 6 in Township 16, but for the most part without success, and a half dozen producers and almost as many dry holes have been drilled in the northern tier of sections in Township 15, Ranges 5 and 6. Until the early part of this summer expansion of the field was to the east in Township 16, Range 6, but in the succeeding months production has been obtained in the southern part of Township 17, Range 6, and another extension took production into Section 30-16-7.

Continued Activity Assured

In both cases the extensions left plenty of vacant territory to be developed as the need arises, and with three trunk lines of major proportions scheduled for completion by the end of the current year Richland faces an indeterminate period of considerable activity. As the field has practically been defined on the west, north and south, this development will likely be in drilling up the large amount of vacant areas within proven territory and exploration for northeast and, possibly southeast extension. The well in Section 30-17-6, Richland Operating Co.'s No. 1 S. R. Humble had 15,000,000 feet open flow, total depth 2,463 feet, enough to encourage further prospecting in that direction, but just north of it the same company drilled on the Chapman land in Section 19-16-7, and got salt water at 2,495 feet. Average depth of producers throughout the proven area is 2,450 feet.

No Surface Indications

Surface beds in the field offer no clue to the subsurface structure, as remarked before, as a reason for lack of enthusiasm among geologists prior to the discovery well. Beds are exposed along the Boeuf River which runs through the field from northeast to southwest. These beds are recent deposits consisting of silts and clays and are at elevations varying from 55 feet, the lowest, in the southwest end of the field, to 80 feet on the north side. Extremes of elevation are found on the banks of the river which in the Alto district, Section 21-16-6, reach an elevation of 75 feet, the ground sloping gently away from the tops of these banks.

Below the mantle of recent deposits are beds of the Claiborne group. The section (after Dugald Gordon, of Brokaw, Dixon Garner & McKee, to whom the writer is indebted for this geology and the accompanying pressure zone map of the field) is approximately as follows:

Recent surface deposits, 100 feet.

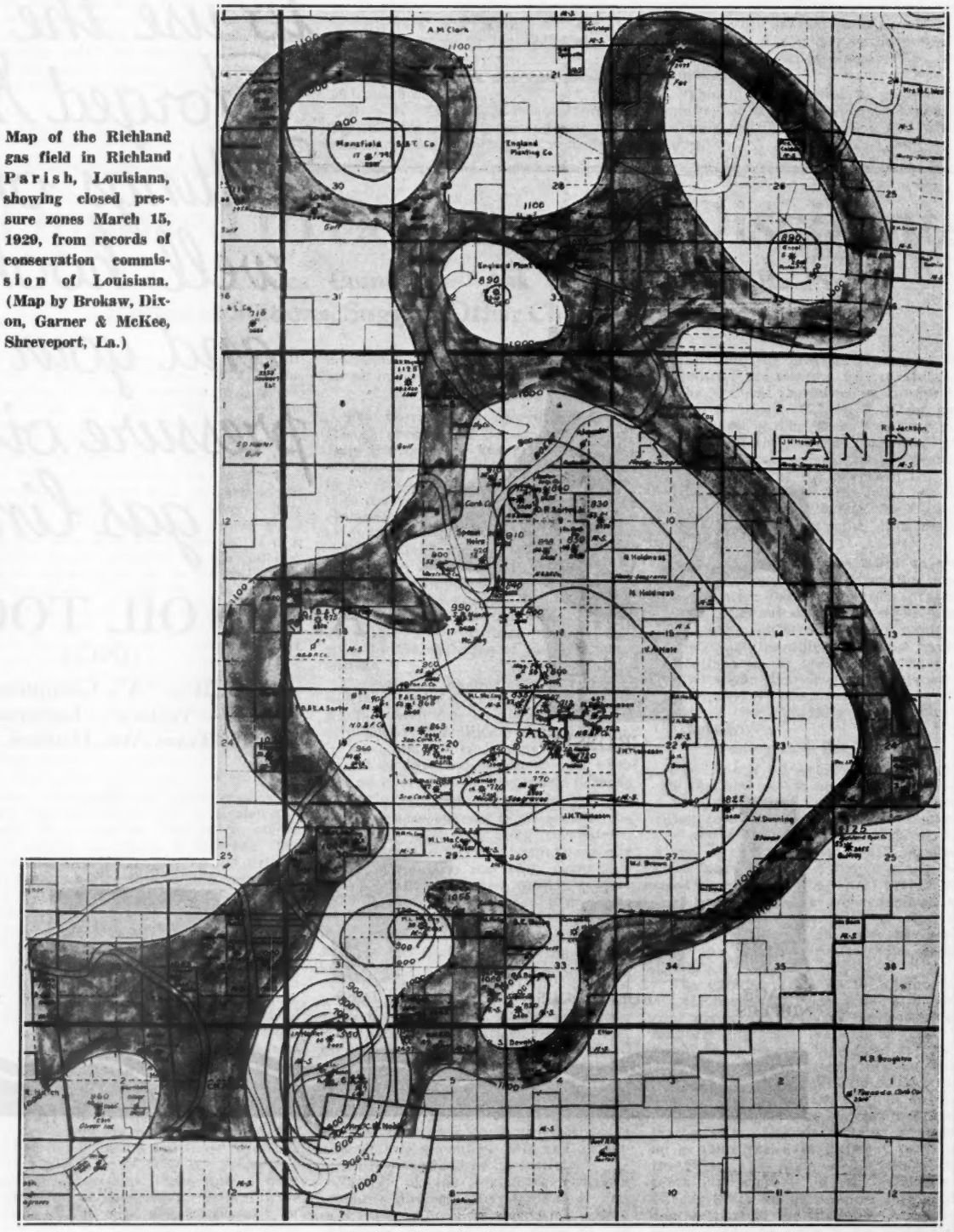
Tertiary Eocene—St. Maurice, 100 feet green sands and gumbo; Sparta, 600 feet sand; Cane River, 200 feet green sand and gumbo; Wilcox, 800 feet sand and gumbo; Midway, 400-500 feet black shale and boulders.

Uncomformity — Cretaceous: Upper Cretaceous, Lower Cretaceous; gas producing horizons: Glen Rose, Trinity.

This section fits the Alto area where up to recently the majority of the wells have been made. In this area the depth at which the base of the black shale beds or Midway will be found in tests can be estimated. In the Alto district this horizon, with the exception of to the north, dips gently away from the the "high" at that town where its depth is approximately 2,325 feet. Three miles west on the edge, but within, of the proven area the base of this formation is found at 2,375 feet.

Below the Midway are the gas producing horizons. These beds consist of gray ash, red gumbo and beds of sand. Proof is had of the sand content of the pay

(Continued on Page 269)



Map of the Richland gas field in Richland Parish, Louisiana, showing closed pressure zones March 15, 1929, from records of conservation commission of Louisiana. (Map by Brokaw, Dixon, Garner & McKee, Shreveport, La.)

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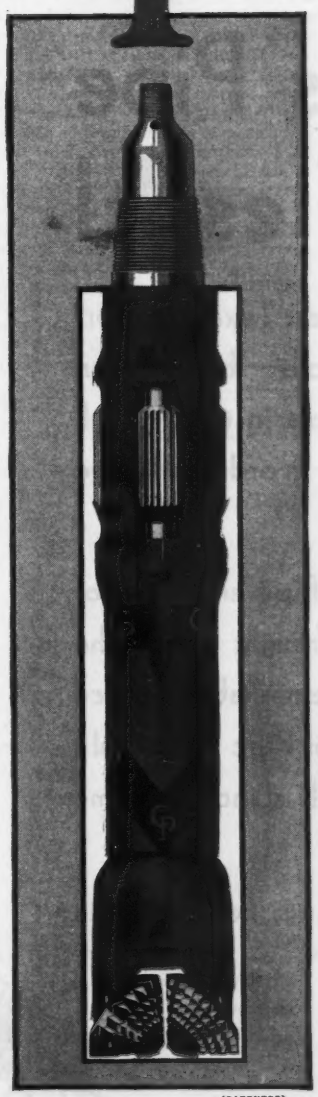

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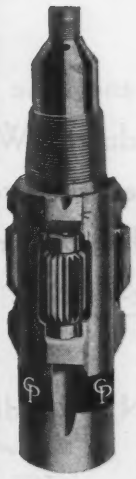

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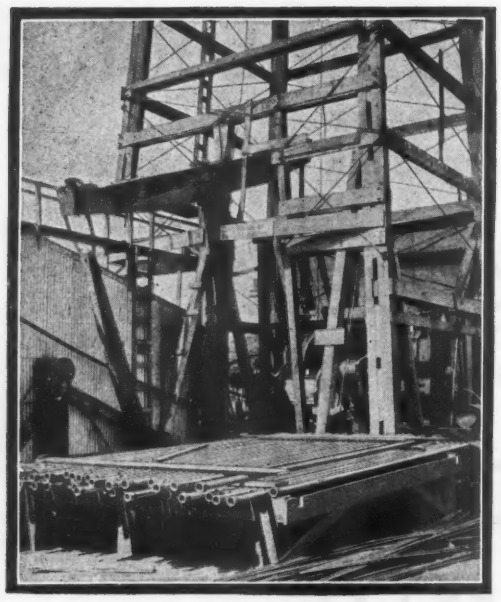

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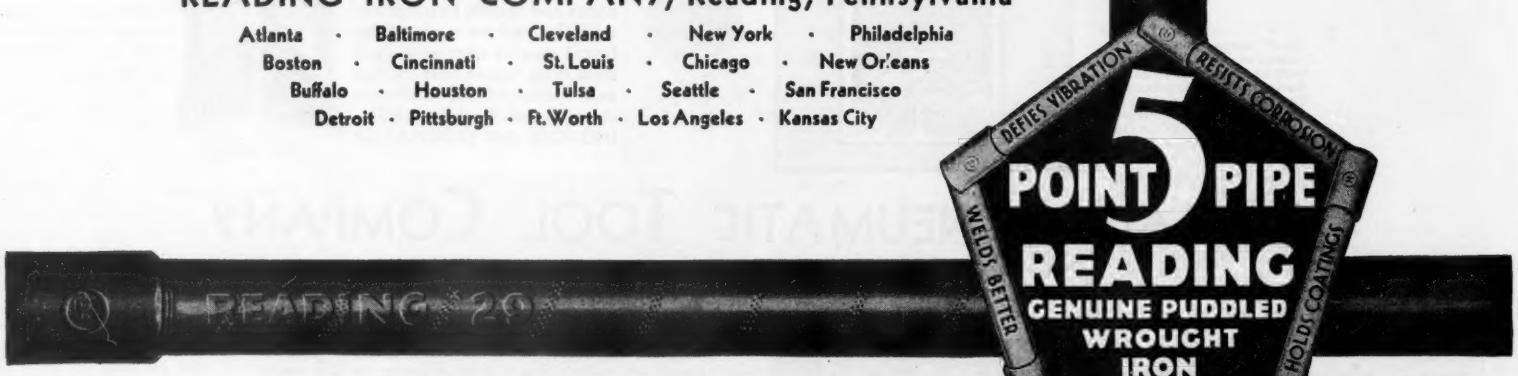

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Need for Manufacturers' Organization

Makers of Oil Equipment Without National Association. Handicap in Tariff Presentation and Foreign Trade

By Charles E. Kern
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., Oct. 7.—On the desk of W. H. Rastall, chief of the Industrial Machinery Division of the Department of Commerce, there is loose-leaf binder filled with typewritten memoranda containing all essential information that it has been possible to gather concerning associations engaged in manufacturing machinery in this country.

Information respecting any association of manufacturers of oil well and oil refining machinery is lacking from this collection because, strange as it may seem, the Department of Commerce has been unable to discover the existence of such association.

The research work pursued by the Industrial Machinery Division has developed that there are about 10,000 manufacturers of machinery of various kinds in the United States and that the 30 trade associations formed by the different branches of the machinery trade have less than 1,000 members. In other words, less than 10 per cent of these 10,000 manufacturers of machinery are organized in trade associations in the United States.

In the automotive section of the Department of Commerce there can be seen and consulted an Automotive Trade Manual issued by that association in co-operation with the department with up-to-date information bearing upon every imaginable question that might be asked concerning automotive trade conditions in every foreign country of the world and frequent revisions and systematized statements are issued to keep this library right up to the minute in respect to changed conditions.

Important in Tariff Discussion

During the discussions of the tariff machinery manufacturers have had no such national organization and such machinery or trade associations as have appeared have been forced to acknowledge that they represent a relatively small constituency and naturally receive proportionate recognition. A national federation of machinery trade associations would represent an industry involving more than 10,000 manufacturers producing in excess of $5,000,000 worth of products annually and obviously would obtain corresponding recognition. They would also be in a position to collect the necessary information and present it to Congress as a whole or to committees or individual senators or representatives in a much more thorough and representative manner.

The late Senator Dillingham of Vermont once told the writer that he had just received a delegation of his state composed of manufacturers of machinery who came to protest against the passage of legislation gravely affecting them. His attention had never been called to it before. This legislation had passed the House of Representatives and had been favorably reported by a committee of the Senate. He informed his visitors that it was practically impossible at that late stage of the proceeding to obtain any modification of the bill and he asked them why they did not arrange to follow proposed legislation from the date of its inception so that they could gain a hearing before any formative action had been taken by a committee. He told them that in its earliest stages legislation could readily be modified by giving adequate reasons, whereas after it had been given the sanction of committees a fight for any change on the floor of the Senate or House of Representatives had small chances of success. He assured them that with thousands of bills annually introduced in Congress no senator or representative could know how they affected their constituents unless informed by the interests involved.

In Foreign Trade

It is because such advice as that given by Senator Dillingham is fully appreciated that trade organizations maintain headquarters in this city where every bill introduced in Congress is read and analyzed so that whatever is pertinent to their own industry may receive prompt attention. The Automobile Chamber of Commerce proceeds on that policy of watchfulness with an adequate staff of representatives, whereas the machinery of this country has no organization of a national character and the manufacturers of oil machinery are without the semblance of an organization to look after the interests of their own products either here or abroad. The machinery manufacturing interests of both France and Germany are fully organized.

While there is a call for oil well machinery throughout the world there is no trade association at all to give such manufacturers help that can come only from thorough organization. In Germany there are 83 trade associations in the interest of manufacturers of machinery and in both Germany and the United States approximately 500,000 men are employed in the machinery trade. These 83 trade associations of Germany have a Federation of Machinery Trade Associations. The machinery industry there is 82 per cent organized against less than 10 per cent organized in the United States and there is no question in the minds of men who have studied this problem of world trade that the American machinery industry is suffering at this time from its unorganized conditions. The many things that are taken care of in an effective way by a national organization are simply neglected in the absence of such an organization because it is no one's particular business to look after the many problems that arise and if any small group of manufacturers have them called to their attention they have no organization through which to work.

French manufacturers are highly organized in the machinery industry and they have 66 associations all related under a parent federation of associations.

Cost Small

It should be remembered that the 10,000 manufacturers of machinery in the United States have a combined output of $5,000,000,000 annually. The property at stake involves the employment of 500,000 men and is so vast that the cost of maintaining a national trade association even on a very large scale is regarded by those who have made a study of this question as very small.

The foreign trade in machinery is to a considerable extent in the hands of foreigners, and it is necessary to invade foreign markets to sell American methods of drilling and refining and this is especially true in respect to installations of cracking processes. It is necessary to sell American methods and that once done American machinery and equipment are quite easily introduced.

Several hundred United States consuls and agents of the Bureau of Foreign and Domestic Commerce, scattered over the world are available for gathering essential facts relating to trade conditions of all kinds. They are an asset to every industry reaching into the foreign market but to be made available under the most favorable conditions a campaign for the purpose of obtaining information must be largely guided by the interests that seek their co-operation. Only those most fully informed concerning an industry's needs are capable of perfecting questionnaires to be distributed throughout these sources of information. While this vast information service, established and maintained at large expense, is available for all American industries it cannot function efficiently in their interest unless they assist in guiding it.

Source of Information

Manufacturers of oil machinery may have many sources of information but the service that has been found indispensable by other industries is one that gathers systematically all valuable data, keeps it up to date by periodical revisions and places it in a form for ready reference. They must have a cyclopaedia of trade information bearing upon their needs. They can never know just what facts relating to the foreign market they may wish to ascertain until an emergency arises in the form of some trade problem calling for immediate consideration.

The foreign market for American oil well machinery varies according to the situation in the world oil industry. During the early part of 1928 foreign sales of American equipment were slow, steadily declining until August of that year. After that, however, with improving conditions in the world oil markets these sales increased steadily to a total of over $16,192,804 for that year which represented a decrease of only $651,000 or about 3 per cent under 1927.

Despite reaction in the sale of American oil well machinery abroad in 1928 foreign sales of such machinery have shown a distinct upward tendency during the past few years and in 1928 such sales exceeded those for 1925 and 1926 by 58 and 6 per cent respectively.

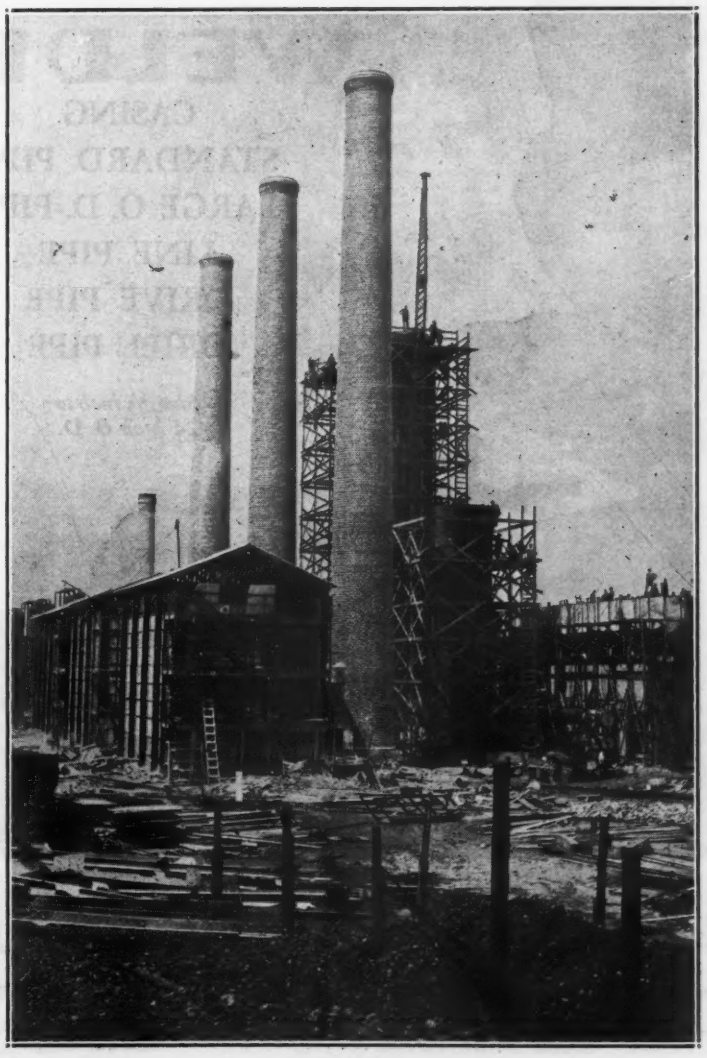
The upward trend in these sales in foreign markets of American oil well machinery, shown at the end of 1928, has continued through the first part of 1929 and the sales for the first five months of this year have nearly doubled those for the corresponding period of the previous year. This has been in the face of sharp competition from British and German manufacturers especially in the oil fields where these countries have heavy investments or some kind of national influence to assist them.

Export Shipments

During 1928 export shipments of American oil well machinery went to nearly 70 countries although the best customers

(Continued on Page 176)

ADDITIONAL PIPE STILLS UNDER CONSTRUCTION



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Fractional Distillation Analysis

Apparatus and Method for Analyzing Gases and Volatile Liquids Into Their Individual Chemical Compounds Described

By Walter J. Podbielniak

This article refers to the apparatus and method for analyzing gases and volatile liquids into their individual chemical compounds which was originally developed by the writer at the University of Michigan (1925-1926) under the direction of Prof. E. H. Leslie. It has since been described repeatedly in the literature in its various stages of development.

While the apparatus was originally developed for use in research work on the composition of natural gas and gasoline, its inherent simplicity and wide range of applications have also made it valuable in the routine industrial analysis of a large variety of complex mixtures falling within its volatility range; natural gas and gasoline, refinery cracked gases and vapors, motor fuels, manufactured gases, volatile solvents, etc. In particular it has been widely adopted by the petroleum industry for research work and routine analysis on petroleum products.

The apparatus in its present state of development is unusually versatile and flexible. It can be used to analyze directly for hydrocarbons of greatly different volatility, from helium, nitrogen and methane, to pentane, hexane and even octane. This is accomplished by using the simplest yet most efficient apparatus practicable and a sufficiently flexible technic of operation to handle such a wide range of composition. When properly used the apparatus has been shown to yield results of high accuracy for even such difficult determinations as that of isobutane in natural gasoline, or of ethylene in a refinery cracked gas. When improperly used, it will like any other analytical apparatus yield results affected by errors varying from a few tenths of a per cent to gross errors, depending on the design, construction and calibration of the apparatus and on the carefulness and skill of the operator, this latter being especially important.

The purpose of this article is to give the results of a critical study of the various elements of the apparatus and the variables in its operation which may be adjusted or controlled to obtain highest accuracy with the hope that they may prove interesting and possibly helpful to users of this method of analysis.

Description of Apparatus

A diagram of the apparatus is shown in Figure 1. The reader is referred to articles already published[1] and[2] for details of its design and operation. Briefly, the sample of gas or gasoline to be analyzed is passed into the bottom of the vacuum-jacketed fractionating column and upwards to the reflux chamber where it is completely condensed (except in the case of components noncondensible at liquid air temperatures); the reflux chamber is filled with a gasoline bath cooled by evaporating liquid air or nitrogen. After sufficient sample is entered into the column, the bottom stopcock is closed, heat is supplied to the bottom of the column using an external resistance winding as shown in the diagram and subtracted at the reflux section at the top of the column, so as (1) to secure any desired pressure in the column, usually atmospheric, and (2) maintain the proper flow of refluxed liquid down the column. The boiling point of the distillate at the top of the column is measured with a thermocouple connected to a sensitive millivoltmeter. Distillation is commenced by partially opening stopcock S-4 whereupon the distillate passes over in vapor form to a highly evacuated bottle where it is collected. The rise in pressure in this vapor receiving bottle as indicated by a closed arm manometer connected to it is an exact measure of the amount of vapor distillate collected. Part or all of the sample is thus distilled, the vapor temperature at the top of the column remaining practically constant while the most volatile component is being distilled in a substantially pure state, and rising rapidly when this component is completely distilled and followed by the next most volatile component boiling at a higher temperature. From the readings taken during this distillation, curves are plotted analogous to A.S.T.M. distillation curves but showing sharply defined "steps" from which percentages of individual components are determined. Figure 2 shows several such typical fractional distillation curves and analyses secured with the apparatus.

The rest of this article will be devoted to a critical investigation of the various assumptions on which this method of analysis is based and the various elements in its calibration, adjustment and operation which, taken collectively, determine the sensitivity and accuracy of the apparatus. In following this discussion, a clear distinction should be made by the reader between those items of apparatus construction, adjustment, and calibration (such as proper evacuation and calibration of the closed arm manometers used) which when once fixed need no further attention and are therefore of minor importance from a practical viewpoint, and between those essential variables of operation such as rate of distillation and hold-up of liquid in the column, which must always be properly controlled to secure good results.

General Precautions

The following precautions are general and not at all peculiar to this method of analysis. Often, however, they are not appreciated or observed so that too much emphasis cannot be placed on their importance. Any one of the general precautions here listed is a more important and potentially greater source of error than all the considerations discussed under this method of analysis proper. This is especially true here because of the extreme liability of gas and gasoline samples to change in composition due to the contamination, absorption, partial condensation, or vaporization.

Securing of Representative Samples

The taking of a properly representative sample of gas or gasoline requires more thought and care than is usually given to it. It should first of all be decided whether the sample to be taken is to represent an "instantaneous" composition of a flowing stream of gas or gasoline or of a gas or gasoline reservoir, or an average composition over a period of time, such as 24 hours. In the latter case a suitable procedure must be followed to sample continuously or semicontinuously in a regular manner over the period of time for which the average composition is desired. A "snap" or instantaneous sample is always to be regarded with suspicion unless it is taken from a gas or gasoline reservoir of constant composition. For instance, the composition of gas from an oil well or from a natural gasoline or refinery plant fluctuates considerably, making a snap sample of doubtful value.

The proper sampling of very volatile natural gasoline is particularly difficult and a very careful procedure must be followed to ensure that the sample taken is of exactly the same composition as the liquid in the gasoline tank.

The size of a gas sample should be determined with due regard to its probable composition and the required accuracy of determination with the analytical method to be used.[3]

Samples of gas for carbon dioxide or hydrogen sulphide analysis should not in general be taken by water displacement, nor should they be in contact with water in the sample container. Incidentally, one drop of gasoline (or ether or similar solvent) contaminating a gas sample container or connections will hopelessly ruin a dry gas sample.

The scope of this article precludes further discussion of the subject of sampling, but the above few comments should indicate the need for very thorough study of sampling procedures and great care in sampling.

Sample Containers

Gas sample containers are either large 3-gallon (or 5-gallon) glass bottles or cylindrical iron containers provided with gas tight needle valves. The glass containers should be filled and corked securely while under water and then the cork very carefully sealed with sealing wax or de Khotinsky cement. Valves should be put on so that the gland packing is not exposed to the sample.

Gasoline sample containers are usually made similar to the metal gas sample containers but of much smaller size. The greatest attention must be made to the kind and quality of valves used. The use of gate or globe valves on either gas or gasoline sample containers is very poor practice. Needless to say the containers themselves should be tested free from leaks.

General Laboratory Practice

The ordinary laboratory precautions should be observed in storing and transporting gas and gasoline samples, such as tight connections, well-ground and lubricated stopcocks, purging air from connections before using for sample, etc.

Choice of Operator

The apparatus discussed does not require thorough technical training or specialized laboratory technic. Naturally, a person possessing thorough technical training and with considerable experience in laboratory work will learn the best operation of the apparatus in less time and will achieve better results than one with less training and experience.

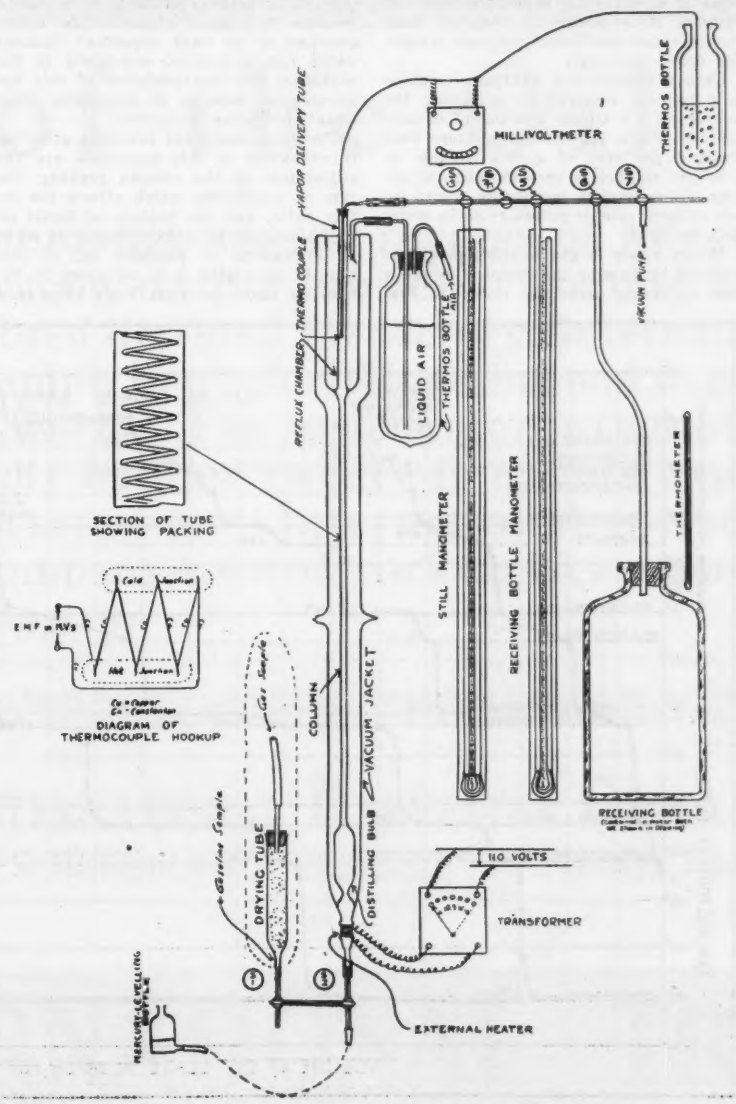


Figure 1—Podbielniak fractional distillation analysis apparatus.

[1] "An Improved Apparatus for the Fractional Distillation Analysis of Natural Gas and Gasoline and Similar Gaseous and Volatile Liquid Mixtures," by Walter J. Podbielniak, published in The Oil and Gas Journal, January 17, 1929.

[2] "Fractional Distillation Analysis, Its Applications in the Manufacture of Natural Gasoline and in the Refining of Petroleum," by Walter J. Podbielniak, published in the Refiner and Natural Gasoline Manufacturer, March, 1929.

[3] "Fractional Analysis of Natural Gas," by Walter J. Podbielniak, published in The Oil and Gas Journal, May 16, 1929. The article is devoted to a consideration of the special difficulties encountered in the analysis of very dry natural gases for gasoline content and the means used to successfully overcome them. A method is described for precooling gas samples before entering them into the fractionating column of the analytical apparatus so as to save considerable time both in wet and dry gas analysis.

There is an obvious advantage in having such a person acquaint himself thoroughly with the method of analysis in order to supervise a routine chemist of lesser training.

The actual operation of the apparatus requires but general knowledge of chemistry and physics and ordinary laboratory experience. It also requires, however, the qualities essential to any good analyst, carefulness, thoroughness, neatness, accuracy and honesty, as well as sufficient ambition and alertness of mind to continually perfect one's technic to obtain the best possible results. The operation of the apparatus, while reduced to its simplest terms, must be varied enough to analyze from methane boiling at —161.4 degrees Centigrade to octane boiling at 125.4 degrees Centigrade, and to analyze samples of varying volatility from natural gas containing 98 per cent methane to heavy absorption oil containing only a fraction of a per cent of gasoline. To entrust its operation to a disinterested, unintelligent and careless analyst may lead to unsatisfactory results through no fault of the apparatus or method of analysis.

Duplicate Analyses

Accidental and unexpected errors may occur in any method of analysis. When considerable importance is placed on the results of analysis of one sample, for instance, for use in designing natural gasoline plants or equipment, it is only ordinary common sense to have such analyses made in duplicate to detect any possible errors.

Interpretation and Use of Analytical Results

After accurate analyses are obtained from representative samples their value will depend on their correct interpretation and proper use in engineering and other practical calculations. They may, for instance, be used in the design of a natural gasoline plant from analysis of field gases or in analyzing the performance of existing plants by means of material balances for individual hydrocarbons[4] or in research work on complex mixtures as described later in this article.

It is necessary for all such applications to have an appreciation of the probable accuracy and dependability of the analytical results, a knowledge of the proper physical constants and other data needed for their use in calculations, and also of the methods of computation themselves which this method of analysis makes possible.

Whenever possible material balances for individual hydrocarbons should be made as illustrated later in this article to serve as overall tests for correctness of sampling and analytical results.

Care of Apparatus and Sampling

Leaks, absorption and contamination of apparatus—An appreciable leak in any part of this apparatus is of course fatal to accuracy, as it would be in any other gas analysis apparatus. However, the apparatus is fairly robust in this sense that very small leaks such as would be fatal to apparatus using low distillation pressures of only a few millimeters, may not be appreciable here. Leaks manifest themselves very readily either between or during analyses by rise in pressure (not due to a temperature change) in the vapor receiving part of the apparatus when closed off, and by "flukey" large drops in vapor temperature at top of column when the distillation rate is decreased or stopped. When leaks are found during an analysis the analysis should of course be stopped and rejected.

The analyst should carefully inspect his apparatus before each analysis for leaks, should grease stopcocks carefully whenever necessary and observe other usual precautions.

When the apparatus is free from leaks and operated so as to secure fairly good fractionation, it should be possible to stop the distillation and to resume it a few hours or even a day later without any appreciable change in the pressure of the vapor-receiving system (except due to temperature change) and without sufficient "fluke" or irregularity in the fractional distillation curve to affect the analytical results.

Absorption of hydrocarbon vapors by rubber tubing should be negligible in this apparatus as all long connections are made of copper tubing and the short rubber tubing connections used shellacked or otherwise coated on the inside to prevent such absorption.

Contamination of the apparatus with liquids is a very serious source of error if present. A drop of alcohol, ether or gasoline present in the gas fractionating column will make a "wet" gas out of an absolutely dry gas sample. A great many erratic results of this kind can be traced simply to carelessness in properly cleaning and evacuating the fractionating column, the connections and the entire apparatus. For instance, a quantity of water, gasoline, alcohol or ether accidentally run into the vapor receiving bottle will spoil the apparatus for use until completely removed by prolonged pumping with the vacuum pump at a pressure of a few millimeters. Water is especially troublesome as it requires several hours of pumping to completely remove it from the system.

Sampling Into Apparatus

Prior to entering a sample into the fractionating column of the apparatus, certain substances must be removed which would interfere with the distillation, namely, water, carbon dioxide, hydrogen sulphide, and any other substances which are insoluble in the mixture to be distilled or tend to freeze in the column. Hydrogen sulphide is undesirable because of its strong corrosive properties and because it is difficultly separable from the butanes, it is preferably removed from the fractional distillation analysis sample, and tested separately.

Carbon dioxide and hydrogen sulphide in a gas are removed by scrubbing the sample with a strong solution of caustic potash. For a gas containing more than about 1 per cent of carbon dioxide or hydrogen sulphide a very thorough scrubbing is necessary to completely absorb it; two or three caustic potash traps in series may be used.

Water vapor in gas samples should be removed by passing the sample through a tube or drying agent (as shown in Figure 1) such as phosphorous pentoxide or dehydrite prior to entering the sample in the column, as it will otherwise freeze and obstruct the column as well as introduce an error in the percentages of the heavier hydrocarbons present. Water in gasoline samples should be carefully drained from the gasoline sample container prior to entering gasoline into the column.

Sampling proper into the apparatus is remarkably simple and should not be complicated by improvements of doubtful value. The two general rules to be observed are, (1) to keep all connections between sample container and apparatus as tight as possible and not to subject them unnecessarily to high pressure or vacuum, and (2) to keep the dead space in the connection as small as practicable. Rule No. 2 eliminates a great deal of complicated procedure designed to avoid partial condensation or partial vaporization of sample in the connections. A very good material for such connections is found in one-eighth-inch outside diameter copper tubing which has a very small bore and into which a gasoline sample may be freely entered without worry over the negligible amount of vaporization which can take place in the small volume of such connections. This tubing may also be used conveniently for making connections from the gas sample container to the apparatus.

For a special method of entering very large gas samples into the apparatus in minimum time the reader is referred to "Fractional Analysis of Natural Gas," by Walter J. Podbielniak, published in The Oil and Gas Journal, May 16, 1929.

How to Secure Best Possible Fractionation

While the underlying theory and computations of the fractional distillation process are complex even for the simple case of a binary mixture, it is easily possible to acquire a qualitative understanding of its most important findings which can be applied practically to the operation and interpretation of this apparatus as well as of any other fractional distillation equipment.

The most important variables affecting fractionation in this apparatus are the adjustment of the column packing, the rate of distillation which affects the reflux ratio, and the hold-up of liquid on the column packing. Accordingly, to make an instrument of precision out of this type of apparatus it is necessary to extend to their practical limit these and other variables favorable to effective separation.

Obviously the most important consideration is the effectiveness of the column packing which should bring about the most thorough and frequent possible contacting of the refluxed liquid streaming down the column with the vapor ascending from the boiling liquid in the distilling bulb. In the column shown in Figure 1, the packing consists of a single coil of wire fitted fairly snugly to the glass wall and designed to make the reflux liquid spiral down the column in a long path, to secure more effective contacting while at the same time the hold-up of liquid on this packing is less than with most other forms of packing. The exact snugness of fit and dimensions of the coil are obviously of considerable importance. As it is impossible to secure glass tubing of exactly uniform bore, each packing must be to a certain extent "tailored" to its column to yield its best performance; it should be adjusted as often as necessary until the sharpest possible breaks are secured in the fractional distillation curves. Fractionation may sometimes be improved by inserting in the coil packing, a secondary very widely spaced coil concentric with the outer coil, or a twisted thin metal strip, to prevent channeling of the ascending vapor and to make a swirl in a more turbulent manner. When properly adjusted, this general form of packing has been found far more effective for this diameter of column than any other packing described in the literature.

Reflux Ratio and Hold-up

Figure 3 shows qualitatively the effect of reflux ratio (controlled through the rate of distillation) and the hold-up (con-

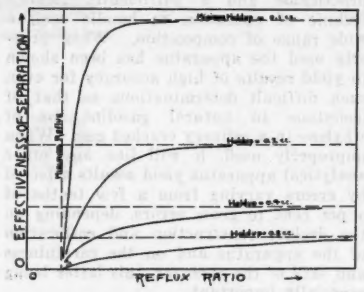


Figure 3—Effect of holdup and reflux ratio on effectiveness of separation. (These curves not based on exact data and only qualitatively correct.)

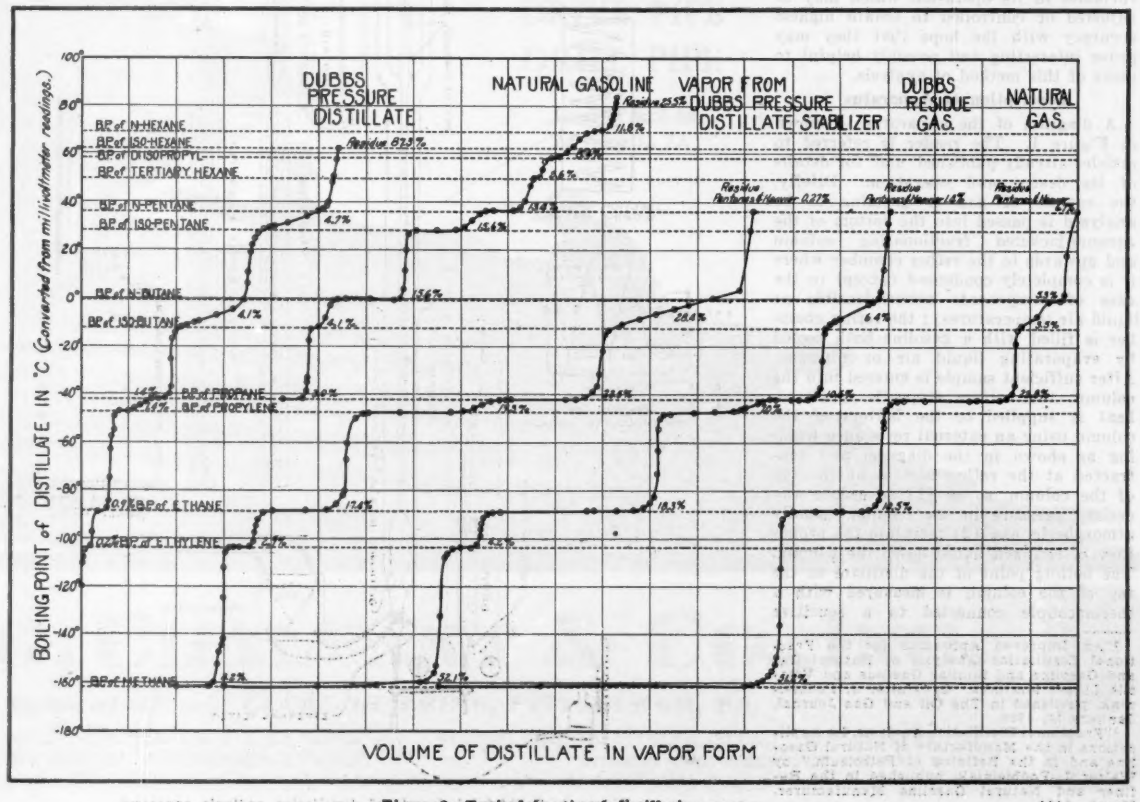
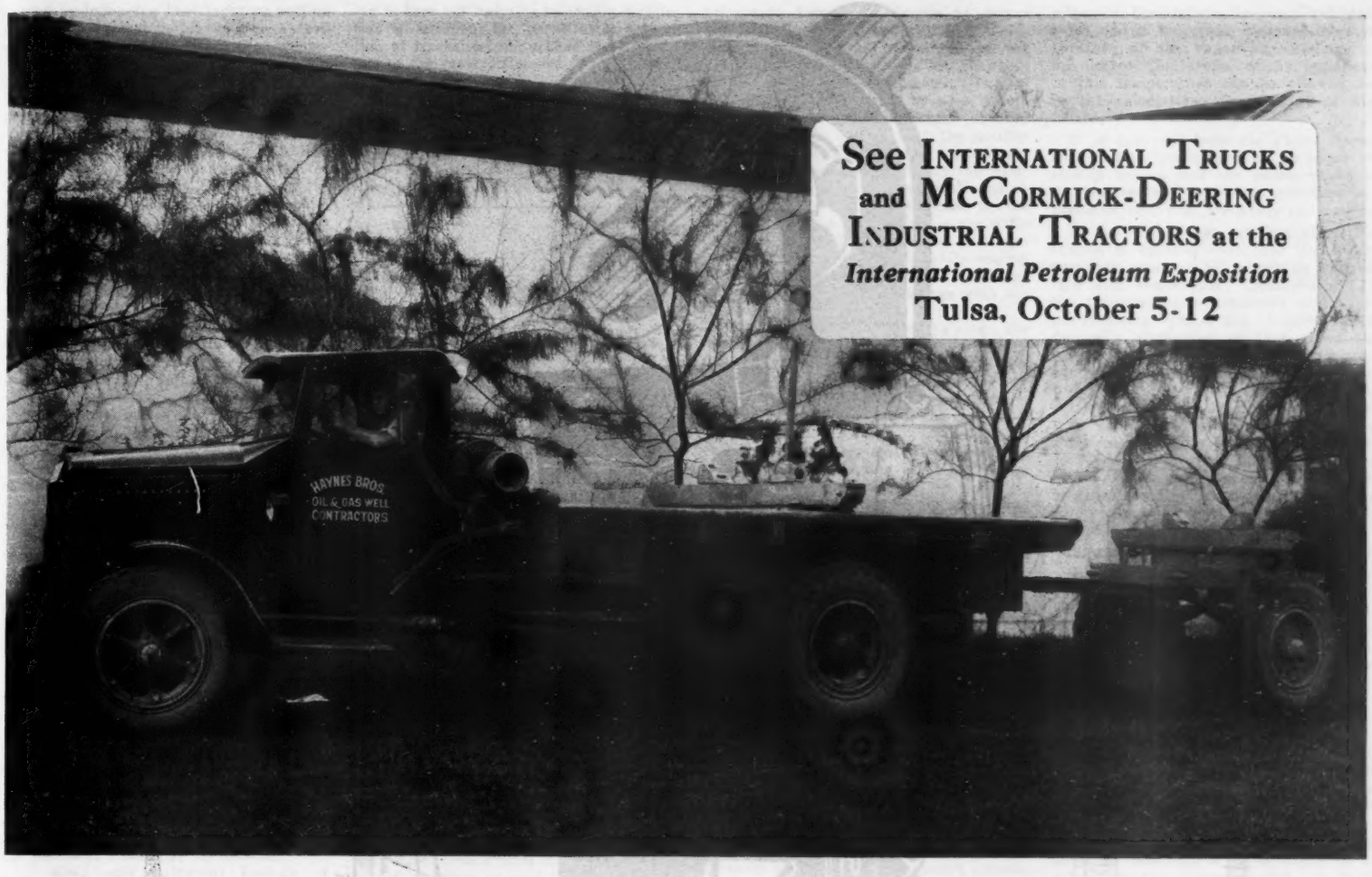


Figure 2—Typical fractional distillation curves.

[4] "Uses of Gas and Gasoline Analysis in the Practical Operation of a Gasoline Plant," by the Gas Analysis Committee of the California Natural Gasoline Association, a committee report presented at the fall convention of the society at Los Angeles, November 13-14, 1928. Several actual plant balances based on fundamental analysis are presented. The use of such balances in testing plant performance is discussed. (Published in Petroleum World, January, 1929.)



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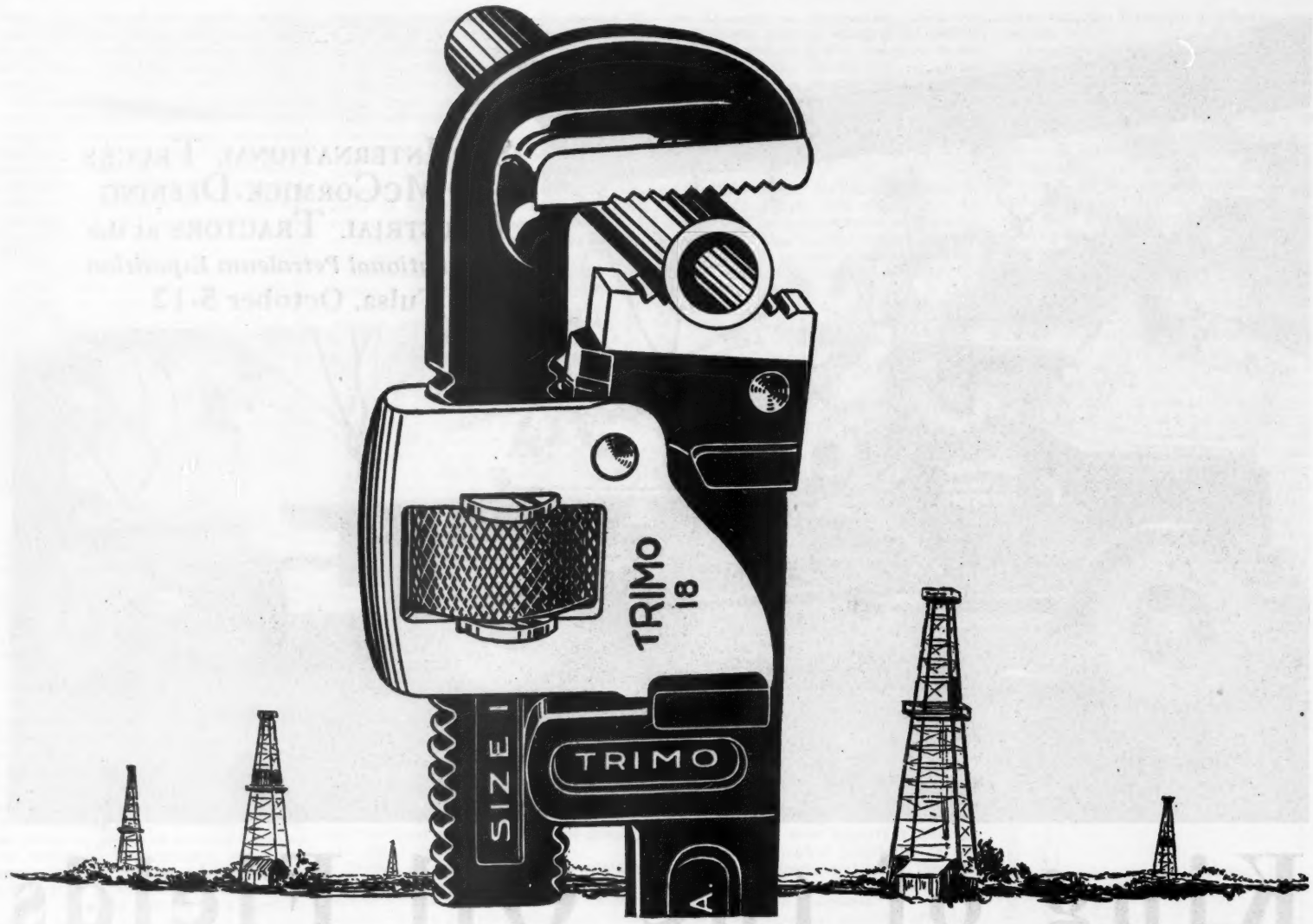

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trolled by balancing heat input at bottom of column against reflux cooling at top of column) on the effectiveness of separation secured. For any particular column the so-called "equivalent number of perfect plates" is more or less fixed; therefore for a given hold-up of liquid in the column the effectiveness of separation will rise rapidly with increase in reflux ratio and then become constant even for an infinite reflux ratio, as shown in the figure. However, by halving the hold-up we will double the length of column acting on a unit quantity of liquid; thus doubling the effectiveness of separation and so on until we get a minimum hold-up below which the capillary liquid films on the wire coil will begin snapping.

Actually, such a wide variation in hold-up as shown is not possible and reflux ratio and hold-up are of perhaps equal importance in their influence on effectiveness of separation. Nevertheless, the curves clearly bring out the importance of "holding up" as little liquid as possible on the column packing.

The importance of a high reflux ratio in securing effective fractionation is much more generally understood and appreciated. In this apparatus the operator controls the reflux ratio by controlling the rate of distillation. The important practical difference between these two controllable variables, hold-up and rate of distillation, lies in the fact that hold-up has no connection with the time of the analysis and may always therefore be advantageously kept at a minimum; whereas the rate of distillation directly affects the time of analysis, and must be varied so as to secure both good fractionation and short time of analysis. Due to the necessarily small capacity of the column, which does not allow a large volume of refluxing liquid, a high reflux ratio requires a low distillation rate.

Practical Rules

From the above discussion the following practical rules may be derived:

1. Keep only sufficient hold-up of liquid on the column packing to barely maintain the capillary liquid films between packing and glass wall of column.

2. Increase rate of distillation in order to gain time as long as good fractionation is being obtained; good fractionation is evident by a constant temperature at the top of the column corresponding to the boiling point of a pure component.

3. Decrease rate of distillation to improve fractionation when the top temperature tends to rise indicating tendency of the pure component being distilled to contamination at the distillation rate used. (When, despite the decreased rate of distillation, the temperature rises to the boiling point of the next component distilled the rate may again be increased as in Rule 2.)

Heat Supply and Reflux Cooling

Even a perfect fractionating column necessitates sufficient heat supply at the bottom of the column to thoroughly boil out the most volatile component being fractionated. Sometimes a considerable error may be due to the insufficient heating of the liquid being distilled, with the result that a false break may occur; for instance, the temperature in the top of the column may rise from the boiling point of propane to that of isobutane while there is still some residual propane in the supercooled liquid in the distilling bulb. This may also occur through insufficient agitation of the distilling liquid, with the result, that the top layer may be exhausted of the most volatile component being fractionated, while the lower layers may still contain appreciable traces. This is especially likely to happen when the distilling bulb is separate from the column, or heated by means of a regulated temperature bath, or in any other way except the scientifically correct way as shown in Figure 1.

Flooding in the column is, of course, an abnormal condition and distillation should immediately be stopped, heating and reflux cooling discontinued, till flooding ceases. In only one case is flooding permitted to a certain extent and that is in the separation of methane from ethanes and heavier. Provided the top temperature of the column remains at or below the boiling point of methane, flooding is here not harmful as simple distillation is sufficient for quantitative separation of methane from ethane and heavier due to the great difference in vapor pressures.

Figure 4 illustrates respectively the fractional distillation curve for an ideal separation and also the nearest approach to this ideal curve which could be obtained with the fractionating column by

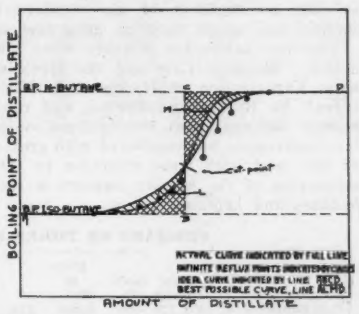

Figure 4—"Infinite Reflux" points and curve.

running at very slow distillation rates. Curve ABCD is the curve for the actual distillation with several "infinite reflux points" where distillation was stopped for a minute or two and temperature readings taken with no product leaving the column. This latter procedure furnishes a very good test for the proper distillation rate and other distillation conditions, as the infinite reflux points should be only slightly below the actual temperature readings obtained during distillation at finite rates.

The greater the difference between the boiling points of two hydrocarbons, the easier it is to obtain their clean and sharp separation; on the other hand, the lesser this difference the more difficult this separation. (See Figure 2.) Especial care should therefore be paid to the fractionation of compounds with close boiling points.

Measurement of Boiling Point of Distillate

The boiling points of the pure components leaving the top of the fractionating column are measured with a copper-constantan thermocouple connected to a sensitive millivoltmeter, the cold junction being kept in the thermos bottle full of crushed ice and water. The "hot" junctions of the thermocouple should be so located in the vapor delivery tube of the column that the surroundings are always colder than the boiling point of the vapor streaming past the thermocouple, and the vapor is at its condensing point. If the thermocouple were placed high up in the vapor delivery tube above the reflux cooling bath, it would measure merely the temperature of superheated vapor somewhere between the condensing point of the vapor and room temperature.

The exact location of the thermocouple junctions is quite important; it may be best fixed by trial, noting the influence of each thermocouple position on the sharpness of fractional distillation curves obtained.

The thermocouples may be calibrated directly by comparison with a standard pentane thermometer or by checking them against known freezing points of pure compounds, such as alcohol, ether, carbon dioxide and mercury. In making such calibrations it is recommended to calibrate the thermocouple together with the millivoltmeter with which it is to be used. However, an equally satisfactory calibration for all practical work is secured by using the thermocouple for several distillation analyses of natural gas and noting the millivoltages recorded corresponding to the very well defined "plateaus" of paraffin hydrocarbons with known boiling points.

As will be apparent from inspection of Figure 2, it is the relative and not the absolute temperatures which determine the "breaks" in the fractional distillation curves. In practice, therefore, it is sufficient to plot the recorded millivoltages against amount of distillate without going to the labor of converting each millivoltage to degrees Centigrade by means of the thermocouple calibration curve.

An error may be introduced in the thermocouple readings due to changing zero point of the millivoltmeter. The instrument should be set to zero before every analysis and frequently checked during analysis to see that the pointer returns exactly to zero point. If frequent adjustments are found necessary the millivoltmeter should be returned to the manufacturer for correction. Changes in the sensitivity of the millivoltmeter are quite rare. A more likely trouble is short-circuiting the thermocouple while sealing it into the column, which will of course seriously affect all the readings with the thermocouple.

The thermos bottle containing the thermocouple cold junctions should be kept full of crushed ice at all times. A few pieces of ice floating in cold water are not sufficient to maintain a zero temperature. The temperature of the cold junction immersed in a thermos bottle without enough ice may vary several degrees from zero with corresponding error in the vapor temperature readings.

While the above errors in measuring the boiling point of the distillate may be very considerable in magnitude, they can usually be immediately detected and corrected in an analysis.

Column Pressure

The vapor temperature readings are always taken at some constant pressure, such as atmospheric for methane to butanes inclusive, 400 mm. for pentanes and 100 mm. for hexanes, and corrected to atmospheric using a special boiling point correction chart. The use of this boiling point correction chart does not introduce appreciable error.

Measurement of Distillate

The distillate from the fractionating column is collected in vapor form in an evacuated receiving bottle, the amount collected corresponding to the rise in pressure in this bottle. The exact amount of this distillate is calculated from the calibrated volume of the vapor receiving bottle and from the measured temperature of the vapor, physical constants of hydrocarbons and an ideal gas law being involved in the calculation.

Let us assume from consideration of the other errors affecting this apparatus that an accuracy greater than 0.1 per cent for the calibration of the vapor-receiving system is not required. Therefore, if the capacity of this system is about 11,000 c.c. an error of not over 11 c.c. in its measurement is permissible. This accuracy of measurement is of course easily obtained. It should be noted that the vapor-receiving system proper consists of all space beyond Stopcock S4 including the dead space in the closed-arm manometer and in the manifold and other connections to the bottle. All this space should be measured or estimated, in addition to the volume of the bottle.

A much greater error than any usual calibration error may be introduced by using thin-wall large glass bottles, such as the usual 5-gallon water bottle. These contract appreciably when evacuated, introducing errors of several per cent in the extreme cases—the contraction, of course, varying with the degree of vacuum. This error should be avoided by using smaller bottles with heavy walls; the carboy type is very suitable.

The variation of dead space in the arm of the closed arm manometer, as the mercury in it rises and falls, is usually insignificant except for manometers of very large bore. It is usually far less than the permissible 0.1 per cent of the volume of the vapor receiving system.

Temperature

A change of 1 degree Centigrade in the temperature of the vapor-receiving system affects a change of about one-three hundredths in its pressure or about 0.33 per cent which is greater than 0.1 per cent permitted above. It is, therefore, necessary to keep the temperature of the vapor-receiving system as constant as possible during an analysis and to measure it within about 0.1 or 0.2 degrees Centigrade. This is best accomplished by putting the vapor-receiving bottle in a large tank full of water (to decrease the effect of fluctuations in room temperature) and to frequently measure the temperature of the vapor surroundings to 0.1 degree Centigrade. Slight variations in this temperature can be allowed for in the calculations for amount of distillate.

It is apparent from the above discussion that the calibration of the vapor receiving system and the measurement of its temperature need not introduce appreciable errors in the analytical results.

In the case of gas samples, all of the sample is distilled over into the vapor-receiving system. All errors in calibration and temperature measurement (if the temperature is constant) of the vapor-receiving system are therefore automatically eliminated as they affect the percentages of all the hydrocarbons present in the sample in the same proportion. The effect of changes in receiving bottle temperature is averaged more or less uniformly over the percentages. Physical constants and conversion factors are not involved in the calculation of gas volume percentages; a gas analysis is therefore free from some of the assumptions and errors which affect liquid analysis.

Calculation and Interpretation of Data

In the calculation of analytical results such as the liquid volume per cents and weight per cents, it is necessary to use various conversion factors to convert pressure rise in the receiving bottle to liquid volume or weight of hydrocarbon. These conversion factors are based on ideal gas and solution laws and known physical constants for pure hydrocarbons. The important physical constants used are molecular weight, specific gravity of the liquid hydrocarbon and densities (if known) of the hydrocarbon vapor at different temperature and pressure conditions.

A rather complete discussion of the physical constants is to be found in an article by the writer entitled, "A Table of Physical Constants of the Hydrocarbons Occurring in Natural Gas," published in the October Petroleum World, page 115. The specific gravities given in this table are probably accurate within 1 or 2 per cent at the outermost. The available data for densities of hydrocarbon vapors are very meager; it is, however, possible to approximate these closely from known saturated vapor densities (at boiling point) using the Beatholet equation relating deviations of a vapor from ideal gas laws to pressure and temperature. Such corrections are rather cumbersome for most practical work and may be rendered mostly unnecessary by precautions to be described.

The very important conclusions to be drawn from the article on physical constants referred to is that deviations from ideal gas laws of hydrocarbon vapors vary: (1) with the molecular weight of the hydrocarbon; and (2) with the partial vapor pressure of the hydrocarbon in the vapor receiving system. The first members of the methane series, methane, ethane and propane are collected under conditions far removed from their saturation points and hence follow ideal gas laws closely. Butanes, pentanes, hexanes and heptanes, if collected at room temperatures and near their condensing (partial) pressures, may exhibit deviations varying from one-half to 4 per cent from their calculated density. In an article by Rogers and Brown[5], a chart is given based on experimental data showing the deviations of the heavier hydrocarbons from ideal gas laws under varying pressures. These deviations are in part due, however, as explained by the authors, to contraction of the thin-walled glass bottle used for receiving vapor as well as other experimental errors. It is obvious that errors introduced through these deviations can be eliminated either by using similar corrections for the factors based on ideal gas laws, or by collecting the hydrocarbons at the lowest prac-

[5] "Raoult's Law and the Equilibrium Vaporization of Hydrocarbon Mixtures," by Marvin C. Rogers and George Granger Brown, a paper presented at the meeting of the American Institute of Chemical Engineers, Philadelphia, Pa., June, 1929.

ticable receiver pressures at which pressures the deviations will be negligible.

Interpretation of Data

When the readings taken during the analytical distillation are plotted in the manner shown in Figure 2 they present a series of more or less sharply defined "steps" or "plateaus." A cut point between the pure hydrocarbons indicated by these plateaus should be located at the point where the ideal fractional distillation curve (See Figure 4) would show a vertical rise. This may be done with considerable precision for even very poor "breaks" by following the "equal area" method discussed in a previous article. The error in locating a cut point will of course be greater for sloppy breaks than for steep, sharply defined temperature rises. The midpoint method for locating cutpoints is not accurate and should not be used.

In distilling constant boiling mixtures of components, the known composition of the constant boiling mixture or mixtures should be considered in making calculations from the fractional distillation curve. Such constant boiling mixtures are not found in the lower boiling members of the methane series determined with this apparatus although present in other chemical series. Data on constant boiling point mixtures are given in Young's Book on "Fractional Distillation," Rechenberg's "Einfache und Fraktionierte Destillation," and in Robinson's "Elements of Fractional Distillation."

Supplementary Tests

The fractionation accomplished in this apparatus is sufficiently effective to analyze natural gas and gasoline in a single distillation directly into the individual hydrocarbons present. Any air, oxygen or other substance noncondensible at liquid air temperatures must be determined separately with the standard Orsat type of gas analysis apparatus. In the case of cracked refinery gases, manufactured gases, and other complex gases containing difficultly separable unsaturated as well as saturated compounds, sharply defined fractions such as ethylene-ethane, may be obtained from the fractionating column and subjected to additional chemical tests to accurately distinguish the unsaturated from the saturated compounds in the fraction. It will be noted in Figure 2 that fractional distillation alone is sufficient for fair separation of ethylene from ethane and propylene from propane.

Accuracy of the Apparatus

The accuracy of this apparatus has been subjected to the ultimate and severest test of several years of intensive routine and research use in numer-

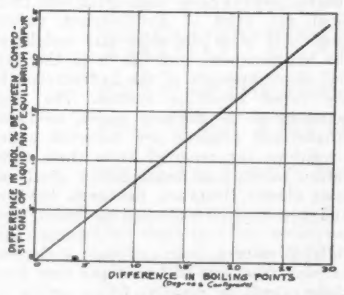
DIFFERENCE IN MOL % BETWEEN COMPOSITIONS OF LIQUID AND EQUILIBRIUM VAPOR
DIFFERENCE IN BOILING POINTS
(Degrees Centigrade)

Figure 5—Influence of difference in boiling points on ease of separation. (This curve is approximately correct for 50 mol per cent minus 50 mol per cent binary mixtures of paraffin hydrocarbons boiling in about the range —50°C. to +40°C.)

ous laboratories. When properly operated following the principles discussed in this article, it has yielded consistently satisfactory results.

The following data are presented to show the numerous ways in which the accuracy of this apparatus has been tested.

Duplicate Analyses. — The first requirement of an analytical method is that it check itself closely on the same sample analyzed by the same operator. The following analyses were made in the research laboratory of a large natural gasoline manufacturing company:

SPECIAL SAMPLE

	No. 1	No. 2	Average
Air	46.80	46.78	46.79
Ethane	2.33	2.28	2.30
Propane	34.47	34.68	34.58
Butanes	14.62	14.51	14.56
Pentanes	1.78	1.75	1.77

The following duplicate analyses were made in the industrial laboratory of a natural gasoline plant:

SAMPLE OF NATURAL GASOLINE

	No. 1	No. 2	Average
Methane	....	....	....
Ethane	.12	.12	.12
Propane	3.05	3.03	3.04
Iso-butane	4.15	4.03	4.09
N-butane	15.82	15.94	15.88

The following analyses were made in a routine testing laboratory:

SAMPLE OF MOTOR FUEL

	No. 1	No. 2	Average
Propane	0.8	0.9	0.85
Butanes	4.0	4.2	4.10
Pentanes	8.1	7.8	7.95
Hexanes	7.0	6.4	6.70
Heptanes	9.8	10.6	10.2
Octanes and heavier	70.3	70.2	70.25

Checks against other analytical methods will of course involve the errors of the other methods as well as of the one under consideration. In the following analyses No. 1 is the apparatus discussed, No. 2 is a modified Shepherd and Porter type of apparatus and No. 3 is a high pressure iron apparatus.

TANK CAR SAMPLE OF NATURAL GASOLINE

	No. 1	No. 2	No. 3
Propane	1.1	0.7	0.9
Butanes	33.4	33.2	33.8
Pentanes and heavier	66.5	66.1	65.3

Analysis of Synthetic Mixtures of Known Composition

The apparatus has been checked repeatedly with results similar to those above against synthetic gaseous and liquid mixtures. Unfortunately, pure propane, iso-butane, n-butane are almost impossible to obtain and this method of checking the accuracy of the apparatus is not usually feasible.

Correlation with 30-Pound 32 Degrees Fahrenheit Charcoal Test

When properly modified the 30-pound 32 degrees Fahrenheit charcoal test for gasoline content as used in California checks with fractional distillation analysis as well as could be expected from the empirical character of the charcoal test[6].

Indirect Checks

The following data are taken from the article, "Vaporization of Complex Mixtures," by Podbielniak and Brown, published in the Industrial and Engineering Chemistry, Vol. 21, page 773, August, 1929:

DATA ON EXPERIMENTAL CONTINUOUS VAPORIZATION

	Grams
Material fed to apparatus	422.0
Distillate	121.0
Residue	302.5
Distillate plus residue	423.5

Analytical Results

	Feed mol %	Distillate mol %	Residue mol %
N-Butane	5.42	11.68	2.00
Isopentane	11.85	17.86	9.54
N-Pentane	32.10	44.56	22.77
Isohexane	13.82	12.59	11.05
N-Hexane	16.54	5.46	24.17
Residue	20.27	4.84	30.48

Material Balance (Basis, 100 Mols Feed)

	From analysis of feed mols	From analysis of distillate and residue mols
N-butane	5.42	5.28
Isopentane	11.85	12 36
N-pentane	32.10	30.17
Total pentanes	43.95	42.53
Isohexane	13.82	11.57
N-hexane	16.54	18.84
Total hexanes	30.36	30.41

The material balance given reveals discrepancies between mol per cent of the individual hydrocarbons as determined from measurement and analysis of the feed to the vaporizing apparatus, and as determined from measurement and analysis of the resulting two fractions, distillate and residue. These discrepancies include, of course, not only the errors in analysis but also the sampling, measurement and other errors of the experiment. Nevertheless, the agreement secured for such a complex process is a severe test on the assumptions of the analytical method and would show up large errors.

The next tabulation is taken from the article, "Raoult's Law and the Equilibrium Vaporization of Hydrocarbon Mixtures," by Rogers and Brown, and represents the analytical results from similar experiments but conducted with greater care and with more attention to the separation of the heavier isomers in the hexanes and heptanes group.

SUMMARY OF THREE RUNS ON MIXTURE NO. 72

Run No.—	1				2			3			Average
Compound—	Mols Pct. in No. 72	Mols in OH	Mols in Bottoms	Ttl.	Mols in OH	Mols in Bottoms	Ttl.	Mols in OH	Mols in Bottoms	Ttl.	Mol % Analysis Fuel 72
Propane	3.22	2.18	1.25	3.43	2.65	.40	3.05	3.44	.12	3.56	3.31
I-Butane	3.56	1.51	1.58	3.09	3.19	.92	4.11	3.81	.30	4.11	3.76
N-Butane	22.10	6.82	17.13	23.95	15.14	6.87	22.01	20.58	3.34	23.92	22.76
Butanes	25.66	8.33	18.71	27.04	18.34	7.79	26.13	24.40	2.64	27.04	26.52
I-Pentane	9.70	1.54	7.17	8.71	4.00	5.61	9.61	6.79	2.70	9.40	9.59
N-Pentane	17.00	1.67	15.88	17.55	6.98	10.90	17.88	12.73	4.27	17.00	17.11
Pentanes	26.70	3.20	23.05	26.25	10.98	16.51	27.49	19.52	6.97	26.49	26.70
I-Hexane	7.06	.38	6.17	6.55	1.38	7.16	8.54	4.26	4.17	8.43	7.63
N-Hexane	12.50	.56	13.86	14.42	1.97	11.16	13.13	6.38	5.99	12.37	13.10
Hexanes	19.56	.94	20.03	20.97	3.35	18.31	21.67	10.63	10.60	20.80	20.73
I-Heptane	6.41	....	....	....	....	....	....	....	....	....	6.41
N-Heptane	12.10	....	....	....	....	....	....	....	....	....	12.10
Residue	6.35	....	22.30	22.30	.79	20.88	21.67	4.88	18.24	23.12	4.24

The analysis of Fuel No. 72 shown in the first vertical column is an actual analysis. The following sets of columns labelled Nos. 1, 2 and 3 respectively, are similar to the tabulation in the preceding paragraph and show similar discrepancies. In order to minimize the effect of experimental errors, the "total" columns are averaged as shown in the last column. It will be noted that this average analysis shows considerably closer agreement with the actual analysis of Fuel No. 72 given in the first column, than the analyses averaged.

The actual analytical errors are probably not over one to two-tenths per cent even over the entire range of isomers from propane to heptane inclusive. Other data and plots given in this article tend to bear out this conclusion.

Other checks occur in the routine use of the method of analysis such as the checking of calculated heating values, specific gravities and vapor pressures, etc., from fractional distillation analysis against experimentally determined values. Calculated heating values and specific gravities of a gas are very close to the experimental values, and afford a check on the analysis and physical constants used in the calculation. Calculated vapor pressures of a gasoline usually agree within about 5 per cent with the actual vapor pressure although they involve deviations from Raoult's law used in their computation.

Checking of Analytical Results Against Plant Production

The most important and in fact the final test of the analytical method has been its routine use to check the production of natural gasoline plants by analyzing the inlet and outlet products, and setting up material balances for individual hydrocarbons similar to those shown above. Such material balances will also incorporate many other errors besides the analytical errors; the gross discrepancies in these balances will therefore not directly reveal the analytical error. The measurement of gas volumes in a plant may itself be from 2 to 8 per cent in error. Nevertheless, it is usually possible to so manipulate the analytical results as to minimize the effect of all other errors except those due to analysis. Several plant material balances are given in a report by the Gas Analysis Committee of the California Natural Gasoline Association, published in the January, 1929, Petroleum World. This report should be referred to for information on the general method of calculation used.

Summary and Conclusions

The general precautions which should be observed in using any precise method of analysis for gas and gasoline are described. The important variables of the apparatus and method of analysis are discussed in detail, to show their effect on the sensitivity and accuracy of the apparatus and how to control them to obtain the utmost practicable accuracy. It should be possible by observing the proper precautions and operating the apparatus fairly efficiently according to principles explained to secure an accuracy at least within one-tenth of 1 per cent for individual percentages. Various data are presented showing typical analyses and checks obtained in practice. These checks show an accuracy from a few hundredths of 1 per cent to two or three-tenths per cent depending on the difficulty of separation of the compounds analyzed and the carefulness of the operator.

[6] "Comparison of Gasoline Content as Determined by Charcoal Test with That Based on Analysis," by P. W. Hill, published in the Petroleum World, January, 1929. "The 30-pound 32 degrees Fahrenheit charcoal test, as used in California, comes within 10 per cent of calculated value and average deviation is 5 per cent in favor of fractionation results."

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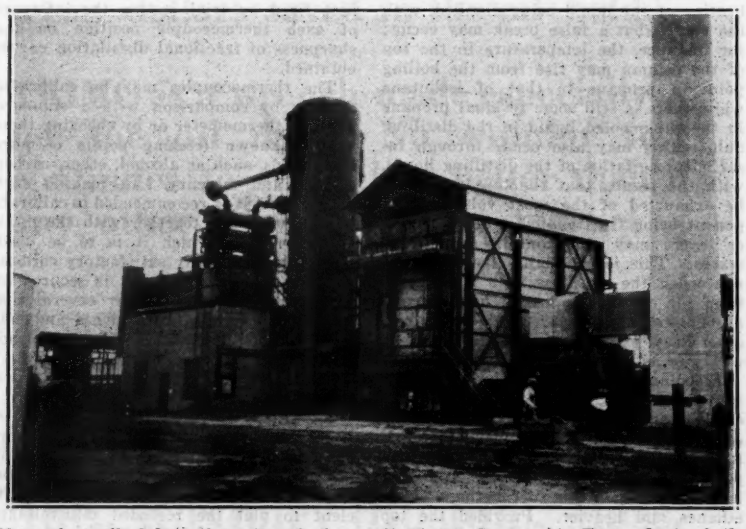
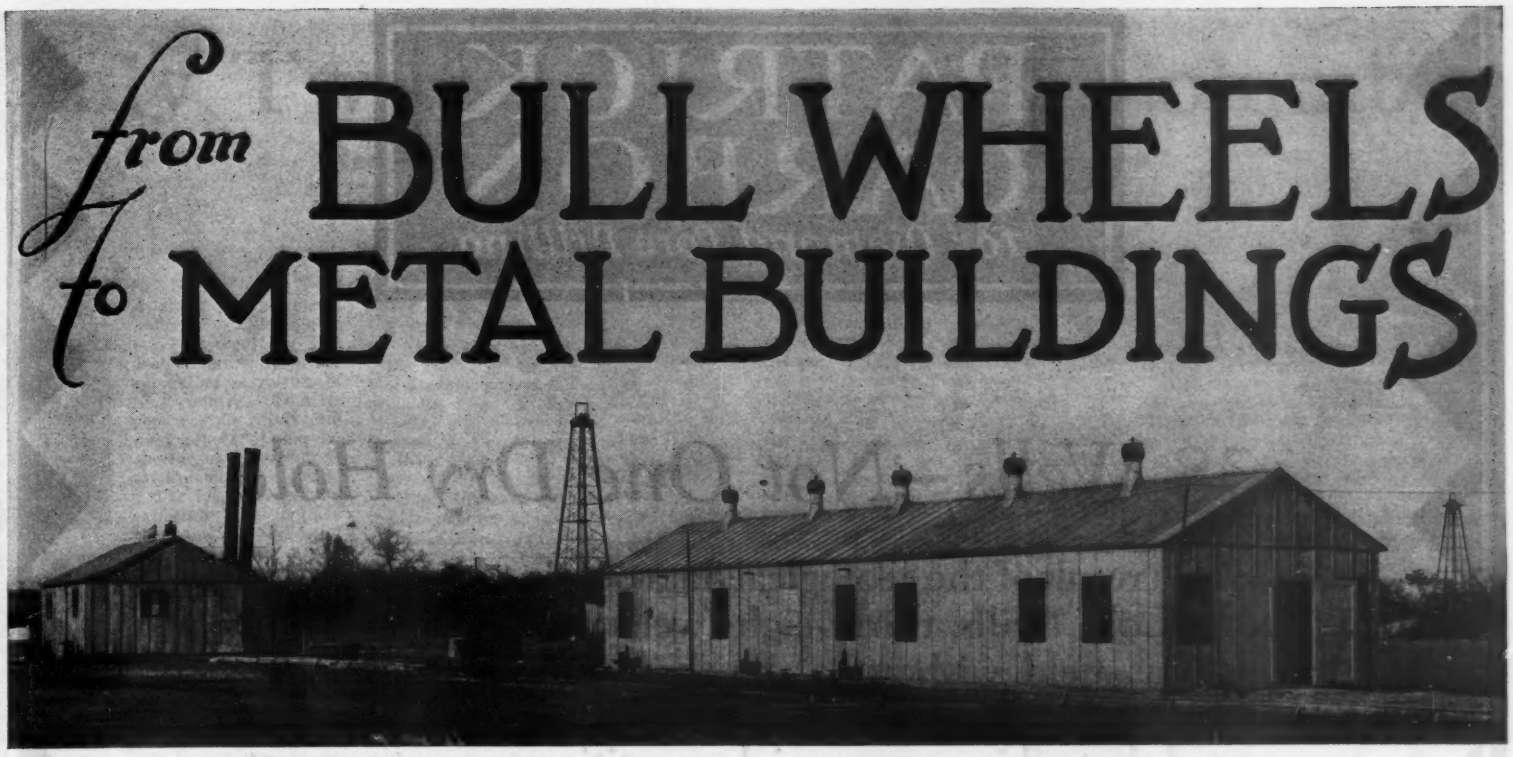


New pipe still lubricating oil reducing unit at the Beaumont, Tex., plant of the Magnolia Petroleum Co.



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Only Two Are Drilling in Columbia

Report of the Inspector General of Petroleum on Operations in That Country. Status of Development Work

By Charles E. Kern
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., Oct. 7.—A great deal is told about the petroleum industry of Colombia in a recent report by Teodosio Ramirez, inspector general of petroleum of that country. This report was the regular annual report of the inspector of petroleum to the Colombian congress.

The inspector general expresses the opinion that the low price of oil is the result of a paralyzed oil industry of Colombia rather than a disposition to wait on the new oil law and at this time he states only two companies are drilling, the South American Gulf Oil Co., and the Richmond Petroleum Co., of Colombia.

The report recites the history of the Barco Concession, in respect to which he states:

"At present there is pending the decision of the supreme court with regard to this matter, which involves many million of pesos, because its wealth, as we stated upon our return from the venturesome visit in the detailed report to the ministry, is well known by the best geologists of the world who have made a study of all the lands forming the watershed of Lake Maracaibo and because we traveled through that land of fierce Motilones Indians with one of those geologists, Dr. J. A. Tong, and heard on the ground optimistic explanations and opinions. Doctor Hubach, a geologist in the employ of our Government, is now traversing the same places, and we trust he will confirm our statements."

American Gulf Operations

Inspector General Ramirez states that active drilling work is being done for the South American Gulf Oil Co. in Las Monas, District of Wilches, in the Sogamoso River Valley, in lands which are considered to be nationally owned and which are the same that General Jose Rosario Dias leased to the Leonard Oil Development Co. for the exploitation of petroleum, and he further says:

"There is to be found here complete equipment for real exploration, with temporary but comfortable houses for offices, ships, warehouses and employes' quarters.

"Seven wells have been drilled without satisfactory results, which, however, were promising, as enough petroleum rose from the first well to justify the drilling of the others.

"We do not doubt the good circumstances of all this region because we consider all the lands to the north, south and west of the De Mares concession to be rich, and for this reason, have indicated them as the best reserves that the nation should have.

"In La Tigra, Rio Negro district, valley of the Lebrija River, the South American Gulf Oil Co. is drilling the tracts belonging to Valenzuela and Ordenez contracted by the Colombia Syndicate for the exploitation of petroleum.

"Some field houses which in years past were used as employes' quarters by the Colombia Syndicate have been rebuilt; a 15 kilometer road for bringing materials from the Provinica station of the Wilches Railway has been constructed; and Ordonez well No. 2 is being drilled with a powerful rotary ring.

"No oil in commercial quantities has been obtained either from the seven former wells or from the one now being drilled. However, those who insist on spending money in these regions so well known by competent geologists and which recently have been the object of special geophysical studies, must have their very powerful reasons for doing so. The head office of the South American Gulf Oil Co. is in Cartagena."

Richmond's Development

The Richmond Petroleum Co., of Colombia, a subsidiary of the Standard Oil Co. of California, is actively drilling in Repelon and Galepa on lands belonging to these municipalities of the Department of the Atlantic with whom it has made contracts the report states and adds:

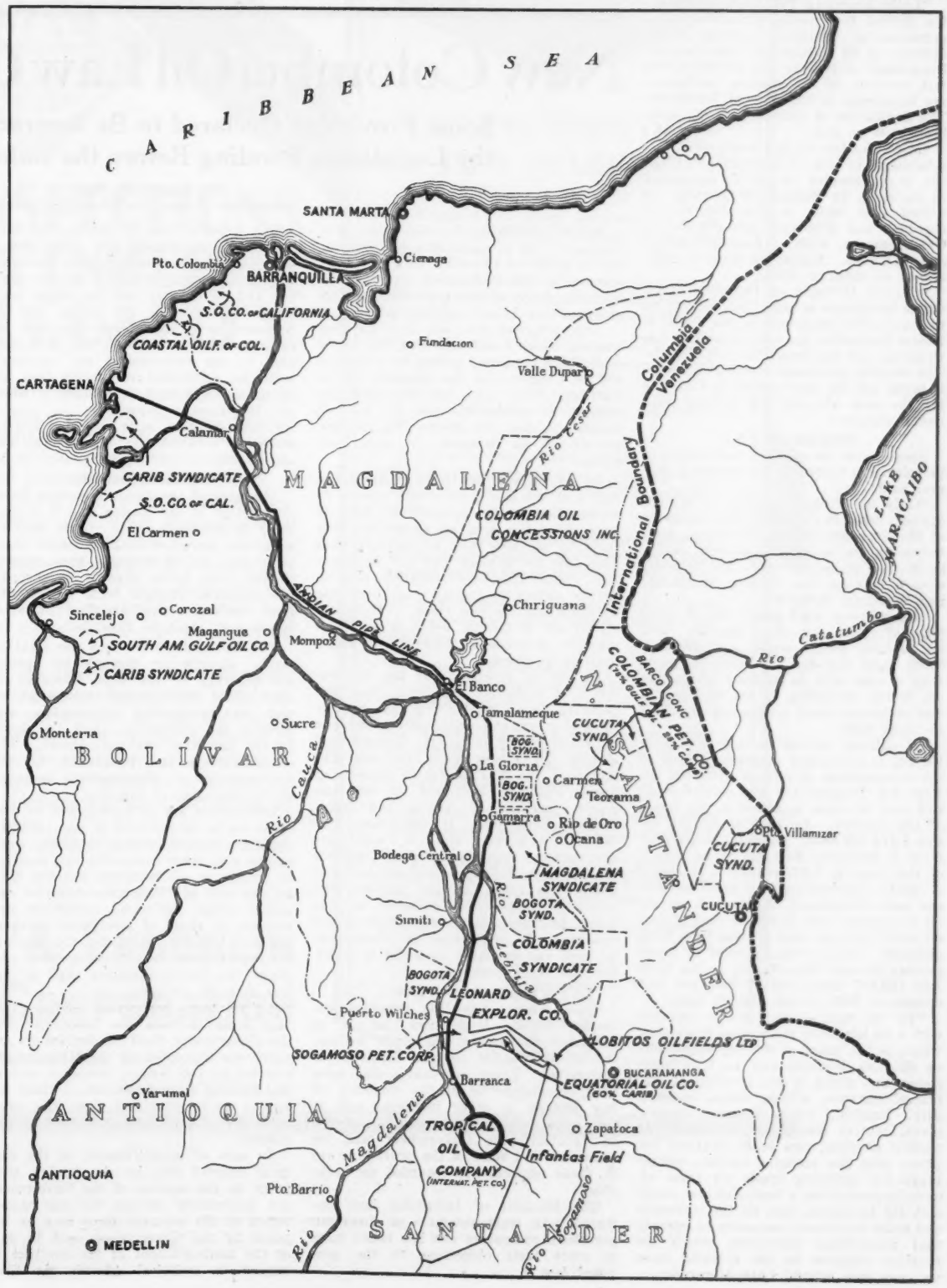
"The Richmond Petroleum Co., of Colombia has set up most modern drilling equipment and portable houses for employes' quarters in Rotinet, Repelon district. It drilled one well until striking gas in sufficient quantities to serve as fuel for well No. 2 which is now being drilled with a rotary rig with equipment sufficient to go down to 7,000 feet.

"It has set up equipment similar to that at Rotinet, near the town of Galapa. Here well No. 1 was drilled until striking gas. The second well is being drilled, with the intention of going down to 7,000 feet if necessary.

"It also drilled four wells on lands belonging to the District of Usiacuri. This work was suspended, to be recommended after observing the results to be had in Galapa and Repelon.

"This company also has a contract with the municipality of Baranoa, covering lands adjacent to those of Galapa. It seems decided not to withdraw until ascertaining if commercial petroleum exists in the region. The office of this company is in Barranquilla."

"Other oil companies whose activities



are described follow: Lobitos Oil Fields, Ltd., an English company, was exploring by drill on the lands called Joy Property in the municipality of Wilches. With a magnificent rotary rig it drilled a well in Almendro, 13 kilometer to the south of the stop on the Wilches Railway, Kilometer 48, called Palestina. It is not known what forced it to take up this costly equipment and store all its materials in Palestina, where same are in the custody of one of its employes.

"Magdalena Syndicate has drilled in Nato and Malpaso, Rio de Oro district, Department of Magdalena, in privately owned lands which were first explored by drilling two wells by the Granada Oil Corp. and later controlled by the Nato Petroleum which did no work. Four wells have been drilled in this region without commercial results. The last was being drilled by the Magdalena Syndicate with a good outfit, in the Malpaso Field; but for reasons unknown to us, it suspended all activities and left everything in care of a laborer last year.

"Latin American Petroleum of Colombia drilled four wells without striking petroleum in commercial quantity in the districts of El Carmen and San Jacinto, Department of Bolivar and withdrew. The last remains of its drilling equipment are in storage in the port of Zambrano. The liquidation of this company is being brought to an end.

"Mid-Colombia Oil & Development Co., subsidiary of the Transcontinental Oil Co., is still keeping its drilling equipment in its camp at Bodegas de Bogota. It drilled four wells in the districts of Guaduas and Guataqui, Department of Cundinamarca, without finding commercial petroleum. Suspended work in 1927. Shows no signs of life.

"Coastal Oilfields of Colombia, Ltd., whose liquidation is being finished, drilled two wells 50 kilometers to the south of Puerto Escondido, the twelfth well in Las Perdicea, not far from Puerto Colombia. The valuable equipment used in this work is being held by Abercrombie & Co., who are the ones who did last drilling work under contract."

Tropical Oil Co.

Speaking of the general exploitation of petroleum in Colombia the inspector general said:

"Only the Tropical Oil Co. is exploiting petroleum in Colombia. This offspring of the Standard Oil Co. is making daily improvements in its field of work in the De Mares Concessions of 512,000 hectares, situate between the Carare, Magdalena and Sogamoso Rivers.

"Its refinery, with a capacity of 7,500 bbls. of crude per diem, together with its packing plant, which manufactures 2,000 cases per day, is being improved with a view still to produce lubricating oil, which, according to its contract, it was obligated to sell to the country since the year 1922.

"It enlivens patriotism to contemplate the key to Colombian progress in view of the consumption of refined products. In 1923 the Tropical Oil Co. refined 340,615 bbls. of crude to attend to the needs of the country. In 1928 it had to refine 1,474,642 bbls. The total amount refined in Barranca Bermeja up to June 1 of this year is 5,507,164 bbls. of crude, of which 17.30 per cent of gasoline, 6.40 per cent of kerosene, 2 per cent of fuel oil for motors, and 72.40 per cent of fuel oil with 1.90 per cent of loss have been obtained. The average amount of crude passing through the refinery during 1923 was 122,887 bbls.; during the first five months of 1929, it was 129,081 bbls.

"To the east, linked to the refinery with a 28 kilometer railway, is El Centro, which is the heart of drilling operations on the Las Infantas and La Cira anticlines, and which is the location of employes' quarters, offices, shops, commissary, hospital, brick factory, electric plant, central compressor for obtaining natural gasoline, new halls, quarters for peons, pipe line pumping station, central tanks for receiving crude oil from all wells in production, a beautiful and ample club for foreigners, and all the materials and other equipment necessary to operate that magnificent enterprise, which we consider superior to the splendid ones we have seen around Lake Maracaibo.

"During the early part of June, last, we found a personnel of 4,438 Colombians and 416 foreigners. More than 55,000 bbls. of crude were being produced per day of which about 50,400 bbls. were being exported and the balance was for the refinery and use by the company. Exploration was continued by drilling the anticlines of San Luis, Colorado and La Mugrosa. We found 404 wells drilled, of which 385 were producing and 19 abandoned. Up to December 1928 the nation's 10 per cent amounted to 4,278,300.20 bbls. of crude, of which all but 994,653.10 bbls. of the second half of 1928 were sold to the Tropical Oil Co. The price per barrel paid for the last four six-month periods was 87 cents, which appears to be rather low. In the case of future sales, the suggestions of the experts to ascertain the price of oil not quoted on the market, will be kept in mind.

De Mares Concession

"Up to the end of last May, 51,861,119 bbls. of crude had been taken from the De Mares concession. The gross production in 1927 was 15,002,175 bbls., and in 1928 amounted to 19,895,677 bbls.

"During the year 1928, 7,083,491,000 feet of gas were passed through the compressors, from which 244,850.46 bbls. of gasoline were extracted, which was mixed with crude petroleum. From the time the Tropical commenced to treat wet gas, we advised the ministry and stated our opinion that we do not consider that the company has a right to these gases according to its contract.

"During the past year 274,018 feet were drilled, and 113 wells put in production. In 1927 only 219,300 feet were drilled.

"The ministry has reorganized supervision of this company by means of the chief of fiscalization and statistics, under whom the inspector of petroleum and his eight assistants were directly placed. The latter were especially assigned to measure the petroleum which enters the refinery and the pipe line. The same occurs in the case of the inspector who, with four assistants, oversees the amounts of crude entering and leaving Mamonal, the terminal station of the pipe line.

Refined Products

"The sale of refined products is made by the Tropical Oil Co. under an organization operating separately from exploitation work. The office of the manager is in Cartagena, from which 24 agencies are directed. On various occasions we have visited the manager's office and some of the principal agencies, in which we have been given all the data we have requested, but we have been asked to maintain the secrecy to which they are entitled. The company says it sells refined products everywhere at the Barranca Bermeja price plus the cost of freight and administration. This business is perfectly lawful, although it may have the appearance of a monopoly, because under its contract the company is obligated only to produce the refined products required by the country and sell them in Barranca Bermeja at the price at which similar articles

(Continued on Page 258)

New Colombia Oil Law Objectionable

Some Provisions Declared to Be Impracticable. Text of the Legislation Pending Before the Colombian Congress

By Charles E. Kern
Washington Bureau, The Oil and Gas Journal

WASHINGTON, D. C., Oct. 7—Copies of the proposed new oil law for the Republic of Colombia have just been received in this city, and a careful study is being made of the provisions of this proposed act by oil interests affected.

This proposed law has had its first reading in the Senate and Chamber of the Colombian Congress, having been submitted to Congress by the Minister of Industries. This draft has long been the subject of discussion and it is well known, it does not meet with the approval of oil interests in many respects.

In its introduction it is declared the object of the law is to assure success in exploitation and to increase by three or four times the area of 15,000 hectares fixed by previous laws as the maximum allowable for explorations and exploitation. Also to increase royalties payable to the nation to "produce an equitable participation for the state." It is declared not to be the desire of the Government to create a monopoly of petroleum in its favor.

It will be recalled that the Government of Colombia employed four experts to assist in drafting this law or in giving critical opinions on it, one of whom was Thomas H. Holland and another H. Foster Bain, formerly Director of the United States Bureau of Mines and now Secretary of the American Institute of Mining and Metalurgical Engineers. It was stated officially, however, that it was not appropriate that the foreign experts should be called upon for opinion and advice regarding several points that might be considered domestic or relating to legal questions peculiar to the country. A committee of Colombian lawyers was employed to assist in wording the legal portions.

Faults in the Law

In a general way this proposed law favors private landowners but it is criticized as placing too much authority in the hands of the Minister of Industries. These are faults that have been complained of as the tendency of law makers in other instances and is the result of an exaggerated tendency to "protect" the Government and its people so that some of the provisions are in these respects not regarded as workable.

The Minister of Industries has conferred with representatives of American petroleum companies and has asked them to state their objections to the proposed law.

Two articles, Nos. 38 and 51, are particularly objectionable, the first giving the Colombian Government the right to dictate the route or plan of the pipe line and its termini and the second providing that drilling for oil or gas in National or private lands can only be pursued after submitting the technical plan to the Government for approval, with the additional restriction that no oil or gas well may be abandoned without Government approval.

Other features such as the sliding scale for royalties are regarded as impracticable.

General Provisions

The general provisions designate lands that belong to the Nation and it is provided in Article 5, "that all the data of scientific, technical and economic character that the Government may request at any time, either directly or through the employes charged with the inspection, vigilance and auditing of such companies" shall be furnished.

The Government reserves the right to verify, directly or through its agents, the accuracy of the data furnished so that all of the technical knowledge, as well as commercial information concerning the companies, shall be placed in the hands of the government. The companies are also to provide for the maintenance of Government employes in the execution of this law.

Colombians are to be allowed to purchase up to 20 per cent of any stock issue made in that country by foreign companies and these companies are required to employ in all branches, not less than 10 per cent of "Colombian superior employes under the same conditions and salaries as those of foreigners of equal category." Three years after the contract for explorations and exploitations is perfected the native employes shall be not less than 25 per cent.

Differences of technical nature that may arise between the companies and the Government shall be decided by experts, one appointed by the Minister and another by the foreign company, and in the case of a disagreement, a third expert is to be appointed from the membership of the Colombian Society of Engineers.

In case of nonfulfillment of the contract entered into by the foreign company, in the opinion of the Government not sufficiently serious for the cancellation of the contract fines may be imposed by the Government; and in case of the nonfulfillment of the contract in respect to technical matters the Government may order the suspension of operations for not exceeding 10 days and in that case the company is to receive no idemnification of damages and can take no appeal.

Must Store Government Oil

Oil companies must store oil belonging to the Government free for a period of 30 days and for longer periods at the rate of one per cent per month per barrel stored.

Companies must deposit five pesos (gold) per hectare applied for as a surety for the discharge of its obligations and no such surety shall be less than 100,000 pesos (gold). In the case of oil pipe lines or refineries the Government will require a proportionate surety bond in each case. In cases of invalidity of contracts or cancellation of permits due to the fault of the contractor the amounts deposited as surety revert to the Nation from the date on which the Government declared the nonfulfillment unless the authorities or the courts annul the resolution issued by the executives. Activities in exploration and exploitation of petroleum, its refining and transportation, etc., are exempt from departmental or municipal taxes.

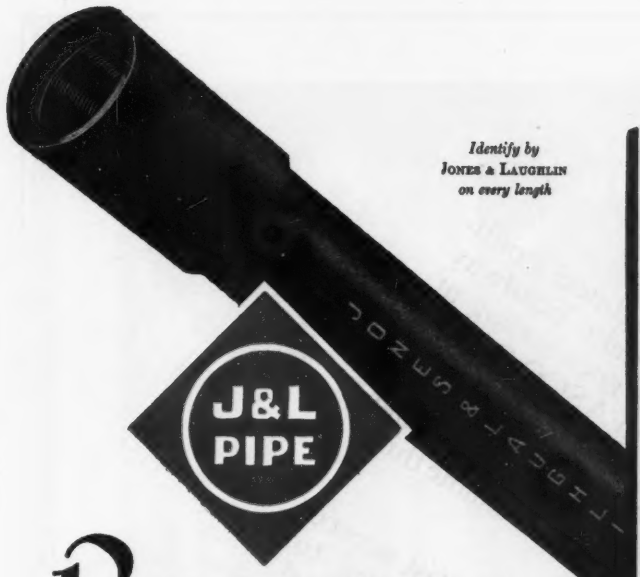
Each person or company obtaining a contract or permit from the Government referring to the petroleum industry must give permanent free instructions for a period of two years to three students selected by the Government. Such company or persons shall also employ them at the same salary and under the same conditions as foreigners employed in similar work.

Contracts relative to petroleum entered into with the Government with aliens shall be subjected to Colombian law and the national courts. Aliens must renounce intention of making diplomatic claims under their contracts except in special instances. No person shall make an aerophotogrametric survey in Colombia without permission of the Government to whom a copy of the work effected must be delivered.

Area of Contracts

Contracts for exploration and exploitation of petroleum belonging to the state must be for an area of not less than 5,000 and not more than 50,000 hectares except in the event that the nation has available for contract an area less than 5,000 hectares. Such tracts must have a length of two and one-half times the greatest width thereof. A company may obtain by transfer rights originating from another contract made by the Government

(Continued on Page 260)



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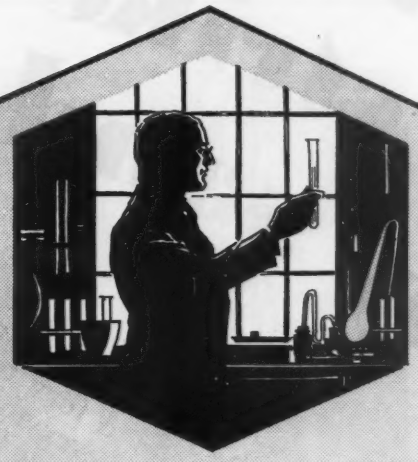

INSPECTIONS OF J & L SEAMLESS

1 Chemical tests of raw materials made at the mines and quarries, also before charging into blast furnaces.

2 Thorough analysis of pig iron produced by blast furnaces and metallurgical inspections as pig iron is made into steel in open hearth furnaces.

3 Chemical analysis for composition as steel is poured from open hearth furnaces into ingot molds.

4 Ingots rolled into blooms under temperature control.

5 Blooms pickled in strong acid to bring out defects. Inspectors pass blooms only after visible defects have been chipped out with pneumatic chisels.

6 As seamless tubes come from the straightener, inspectors scrutinize both outside and inside surfaces with the aid of specially designed lamps.

7 Ends trimmed; then pipe is inspected for wall thickness and correct outside diameter and roundness.

8 Pipe threads checked with certified gages and second inspection made for flaws, to insure clean cut accurate threads of proper pitch and taper.

9 Couplings as produced in our mills are closely inspected for correct tapping, threads accurately gaged for pitch and taper and checked on specially designed machines for alignment.

10 All items of previous inspections rechecked on testing benches, and stencil marks applied.

11 Each length given hydrostatic pressure test before rust-resisting coating is applied and pipe is delivered to shipping platform.

12 Final inspection of each length as it is loaded for shipment.

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Regional Structure in Texas Permian

Structural Development and Oil Accumulation in the West Texas Area. Three Factors To Be Considered

By Robin Willis*

Regional structure in the Permian basin is due to the sinking of basins around positive elements. In the south the sinking was combined with uplift along the Marathon fold. These structures have been modified by post-Cretaceous deformation in the mountain areas. This is the Basin Range or block faulting type.

The limestone highs within the Permian basin are in part depositional and in part structural. The Getty high is a reef overlain by a typical compaction fold. The Winkler County high is a combination of a reef with a deformational high. The varying relations of these two factors determine the character of production encountered from Winkler County north into Lea County. The Yates high is thought to be depositional whereas the Big Lake high is thought to be structural. The evidence for and against these conclusions is analyzed.

The final determination of the character of each limestone high in the basin is to be found in the structure of the beds below the Big lime.

There are three factors which must be considered in studying structural development of the Permian of West Texas and southeast New Mexico. These are: first, regional structure due to sinking of basins around positive elements; second, local structure due to deformation; and, third, structure due to deposition. Oil accumulation depends upon relation of these three factors to one another and to porosity.

It is not possible to evaluate the importance of these factors in all of the producing fields of the Permian but in certain cases sufficient information is at hand to permit the tracing of the structural history with a fair degree of certainty. It is the purpose of this paper to describe these cases and point out the application of the evidence they present to the study of the other structures of the region.

Structural Features of the Basin

The broader structural features of the Permian basin in West Texas and southeast New Mexico include two principal basins divided by a double line of highs. The basin east and north of these highs may be termed the main West Texas basin, that west of them the Delaware Mountain basin. The two more or less parallel highs between them are the Crane, Upton and Ector County high, on the northeast, and the Ward, Winkler and Lea County high. In addition to these there are the following limestone highs in the basin: the Garza County high, the Howard and Mitchell County high, the Big Lake and World-Powell high, the Apache Mountain high, and the Getty high in Eddy County, New Mexico. These highs are mapped on the top of the Big lime, and most of them are reflected in the beds above the lime.

The questions that arise in regard to the limestone highs are: first, how was the limestone structure itself formed?; second, how was the structure in the beds above the lime formed?; third, what was the age of deformation, if any has occurred?; and, fourth, what is the structure in the beds below the lime?

Development of Regional Structure

Two distinct periods of deformation may be recognized in the development of the major structural features of this region. The main basins were formed during Permian time, but there was little actual local deformation north of the lime of the Marathon uplift. The effects of post-Permian deformation can be recognized in the mountain uplifts of the Davis, Guadalupe and Sacramento Mountains, and of the smaller ranges west of the Pecos. This deformation is probably contemporaneous with the deformation of the Basin Ranges of Utah, Nevada, Arizona and western New Mexico, and is related to the Cordilleran province rather than to the deformational effects found in the Mid-Continent region.

On the east a long monocline extends from the axis of the Bend arch westward to Reagan, Glasscock, Howard, Mitchell, Scurry and Garza Counties. This monocline was formed by the sinking of the main West Texas Permian basin, most of the movement occurring during Double Mountain time. On the north deposition thinned over the positive element of the Panhandle arch. On the south the Big lime is turned up rather abruptly under the Comanchean cover, and it is thought that this represents the eastward extension of the Marathon uplift. This line was not only a positive element, but was repeatedly uplifted from late Pennsylvanian time, when it was strongly folded, until after the close of the Permian. A renewal on the old line of weakness in post-Comanchean times is shown by the doming of Comanchean beds in the Glass Mountains. The force which caused this latest uplift probably came from a different direction from that which caused the earlier uplifts.

On the west the long monocline of the Delaware Mountain formation is at least in part of Permian age. This is shown by the thickening of the salt eastward. To the north, in the Guadalupe Mountains, the beds to the west of the subsurface monocline have been tilted to the east in the Guadalupe Mountain uplift, and those farther north and west have undergone similar deformation in the Sacramento Mountains. These two uplifts are bounded on the west by faults and sharp flexures, and this deformation is thought to be post-Cretaceous in age.

In the Apache and Davis Mountains a long sharp monoclinal flexure and fault forms the northeast face. This can definitely be dated as post-Cretaceous, as beds of that age are involved in the faulting.

Capitan Reef System

It is now a generally accepted fact that at least some of the limestone highs of the Permian basin are depositional rather than structural. Limestone reefs of great magnitude are found on the surface in the Guadalupe Mountains, the Glass Mountains and the Apache Mountains. The best known of these is that of the Guadalupe Mountains, the reef limestone itself being designated as the Capitan limestone.[1] This reef can be traced in the subsurface through the Getty Pool. Stratigraphic conditions in this pool are duplicated so closely in southeastern Lea County and in Winkler County that there can be little question that the Winkler and Lea County high is a part of the Guadalupian reef system. We can study the reef structure on the surface and by analogy determine how much of the Winkler County structure is due to reef building and how much is due to deformation.

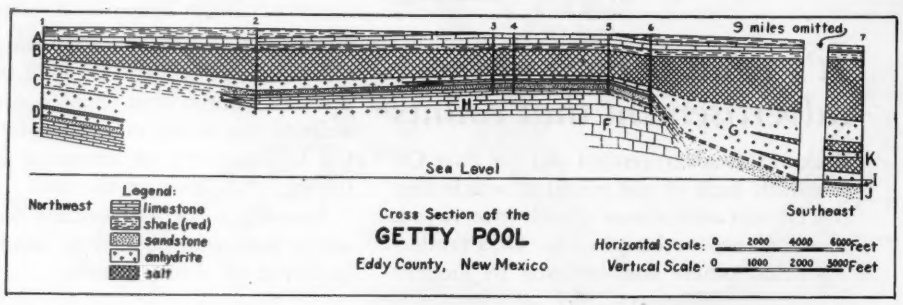
The line of the Capitan reef, though a definite limestone high, must not be confused with the uplift of the Guadalupe Mountains. The former runs northeast. If it is related to any structural feature it was formed on the southeast flank of the Bone-Springs-Tank Canyon positive element, but the exact nature of this structure is not known. The Guadalupe Mountain uplift is of the so-called Basin Range type, with a sharp flexure combined with faulting on the west face, and a monoclinal tilting to the east.

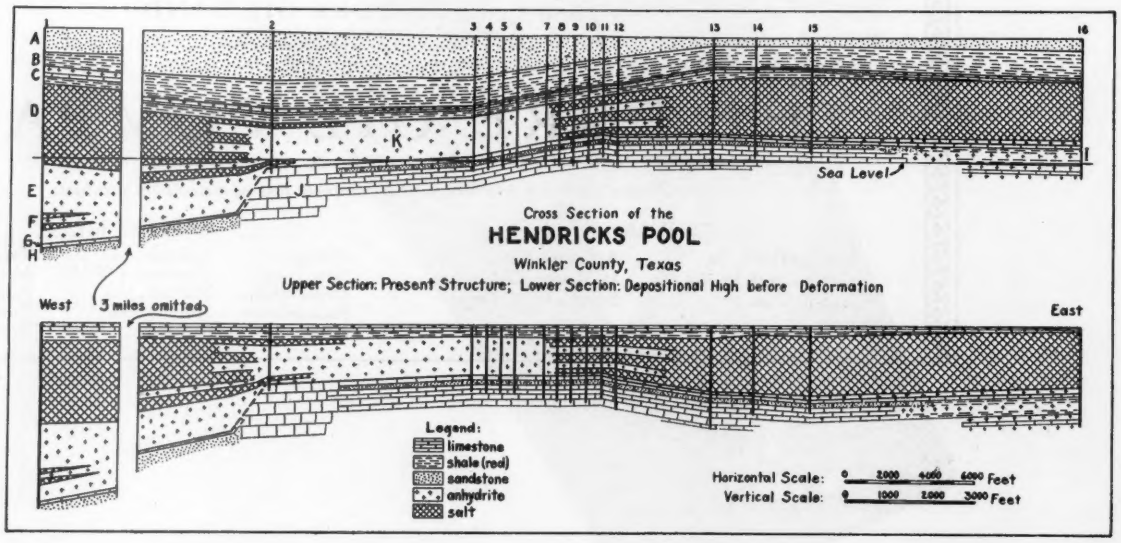
Getty Structure

The Getty Pool is shown in cross section in Figure 2 (Number 9 and line AA, Figure 1). It shows the characteristics of a normal reef with no deformation except that due to regional tilting and to compaction. It is similar to the structures found to the west on the surface. Structure mapped on the top of the lime shows an asymmetrical cross section and a very steep dip on the seaward (southeast) side. The structure is rather flat on top and has a comparatively gentle northwest dip. To the northwest the limestone of the upper part of the reef grades into or interfingers with gypsum, anhydrite and red beds. The limestone of the lower part of the reef grades into the San Andres limestone. Points taken on the top of the first limestone encountered, therefore, show a drop to the northwest as steep as that to the southeast, but this is not a true dip. It is merely due to the gradation of the upper limestone into the anhydrite series. Above the limestone the beds thin over the crest of the structure, being thinnest over the highest point in the lime. They reflect the structure in the limestone, however, and the axis in the Rustler at the top of the Permian series is directly over the axis in the lime. This feature may be accounted for entirely by differential deposition and compaction over the topographic elevation of the reef without recourse to folding.

The Getty structure is apparently a plunging one, but the plunge corresponds to the regional dip of the San Andres and Carlsbad limestones on the surface. This dip is due in part to the sinking of the

(Continued on Page 257)





[1] E. Russell Lloyd, Capitan Limestone and Associated Formations of Texas and New Mexico. Preprinted from Bull. Amer. Assoc. Pet. Geol., March, 1929.

K. H. Crandall, Permian Stratigraphy of Southeastern New Mexico and Adjacent Portions of West Texas, preprinted from Bull. Amer. Assoc. Pet. Geol., March, 1929.

W. G. Blanchard, Jr., and Morgan J. Davis, Notes on the Permian Stratigraphy and Structure of Portions of Southeastern New Mexico and Southwestern Texas. Presented at Fort Worth before the Amer. Assoc. Pet. Geol., March, 1929.

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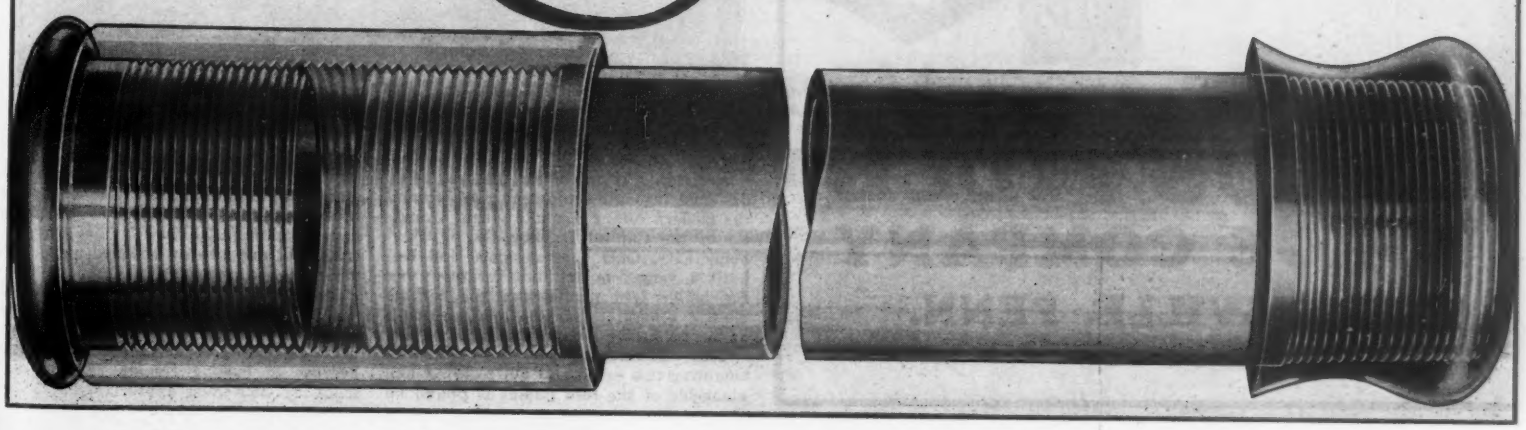

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MANUFACTURERS NEED OWN ORGANIZATION

(Continued from Page 159)

formed a comparatively small group where oil production is heaviest. In this respect Venezuela is far in the lead as an outlet for American oil well machinery so that in 1926 sales of such equipment were more than double those of 1925 and there was a further substantial increase in 1927. Some producers of Venezuela regard the heavy purchases of oil well machinery in 1927 as having recorded the peak of buying in that country for the present.

Next to Venezuela the Netherland East Indies held rank as an outlet for American oil well machinery during 1928. In this year such sales were 21 per cent over the previous year and nearly double those of 1925. Most of these sales were to American oil interests and there was a strong background of competition from British and German manufacturers. Their recognized quality and cost reducing advantages comprise the strongest talking point for American oil well machinery.

There was a marked increase in shipments of American machinery to Rumania so that in 1928 these shipments were nearly three times those of 1927.

A substantial increase was recorded in shipments to Mexico in 1928 over those of the previous two years in spite of the steadily declining production in that country.

In 1928 Colombia imported more oil well machinery than in the previous two years and more than doubled the importations for 1925.

Canada bought nearly $700,000 worth of equipment in 1928 which marks a heavy increase in that area where oil discovery of any important nature is a recent development.

Russia in 1928 imported approximately $1,114,000 of oil well equipment, the fluctuating conditions there causing this importation to decrease from over $2,000,000 in 1927.

Strong British competition is encountered in the Burma oil fields and American sales of oil well machinery were less during 1928 than for the three preceding years, declining more than 70 per cent under the peak of 1927. These competitive conditions give little hope for improvement in the volume of American exports of machinery.

Persia buys British equipment very largely as the oil industry there is controlled by the Anglo-Persian Oil Co.

Drilling Equipment

Oil well drilling equipment constitutes by far the most important item in the sales of American oil machinery, being about one-half of the total of such sales. During 1928 these total sales declined under 1926 and 1927 but still were approximately 48 per cent over the sales of 1925.

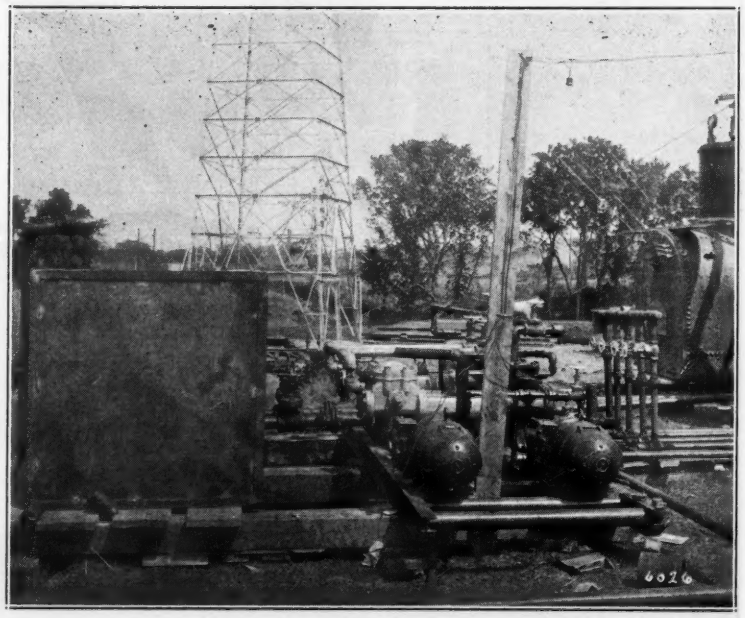
As is well known the various interests now active in drilling for oil abroad, as well as in the establishment of oil refineries, are more diversified than they have ever been.

Ambition to establish oil industries is being developed by practically every nation within whose limits oil deposits have been discovered and there is a strong tendency on the part of such nations to favor corporations controlled by their own nationals. These conditions tend to make necessary efficient salesmanship in disposing of American oil machinery. They point to the necessity for organization on the part of American manufacturers of such machinery with the assistance that could be obtained by the activities of a federation of manufacturers of all classes of machinery on the plan that has been so successfully carried out by the Automobile Chamber of Commerce.

Methods of gathering and assembling trade information for the benefit of any industry have been so fully developed and standardized that the formation of such organizations, together with the larger national federations composed of specialized groups of an industry, that additional efforts of that kind are easily carried out as all existing systems are readily accessible as guides for a new organization.

The Oil and Gas Journal through its Washington representative will gladly furnish any further information on this subject that is available here.

PORTABILITY FEATURE IN ROTARY EQUIPMENT



Portability is one of the features being designed into all equipment used around the modern rotary rigs and Harry Franklin of the Capitol Drilling Co. of Oklahoma City, Okla., has designed and had built a very compact unit for mounting the boiler feed pumps and the turbine electric generators for the lighting plant, as shown in the accompanying picture.

This picture shows the method of mounting this equipment quite clearly and alongside of the feed pumps is placed an auxiliary water tank. The whole equipment can be disconnected and made into units of a size suitable for easy moving and the electrical connections to the generator set are also so designed as to permit of quick assembly.

Details of this kind are being worked out by the field men in many fields and form the basis for a development of new practice that is reducing cost of drilling because of cutting rigging up and dismantling time quite appreciably.

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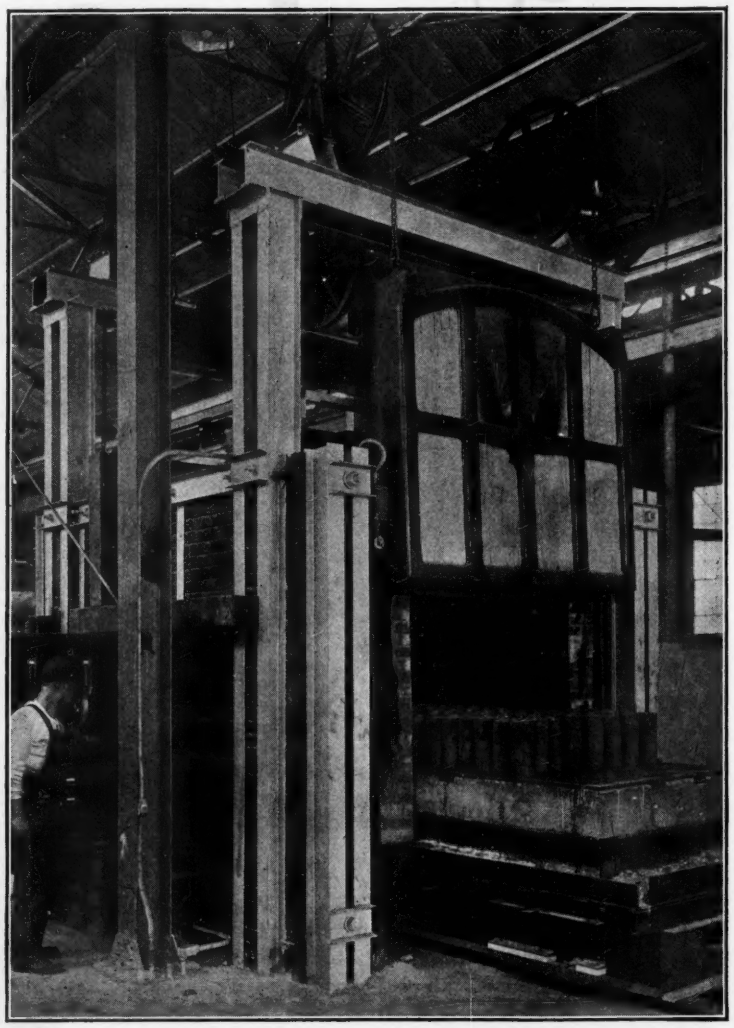
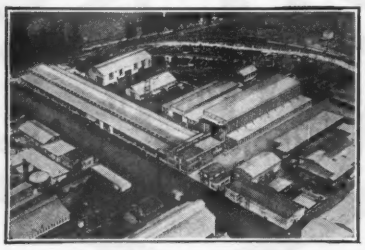
Sales Offices: Hunt Bldg., Tulsa, Oklahoma; Magnolia Bldg., Dallas, Texas; Central Building, Wichita, Kansas.

KEEPING PACE

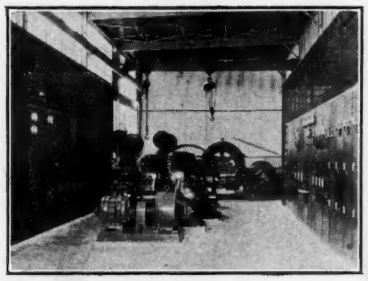


TO increase production of tool joints, bits, drill collars and other forged tools, Baash-Ross has recently installed this latest General Electric Car Type heat-treating furnace, handling a 3½ ton load every four hours and holding temperature above, below, and on all sides of the work within plus or minus 5 degrees by means of automatic pyrometer control.

Beginning 1929 with 64,000 square feet of floor space, there have been added a new tool room, a central power control and transformer house, two main machine shop bays, and several smaller buildings . . . 19,708 feet . . . to keep pace with the industry.



Left: Main Los Angeles plant of the Baash-Ross Tool Co. from the air.



Right: New central power control, transformer, and compressor house.

J. & L. Seamless Steel Casing and Tubing in stock at Wilmington Yards for immediate delivery

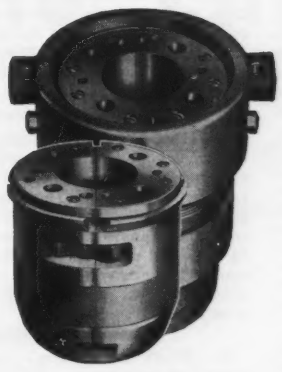
BAASH-ROSS

General Offices and Plant, *5512 Boyle Avenue*
Export Department: . . . . *30 Church Street*, New York
District Offices: Houston, *1816 Nance Street* . . . Tulsa, *International Supply Company and Lucey Products Corporation*

WITH THE INDUSTRY

Three of the outstanding Baash-Ross tools since the last International Petroleum Exposition:

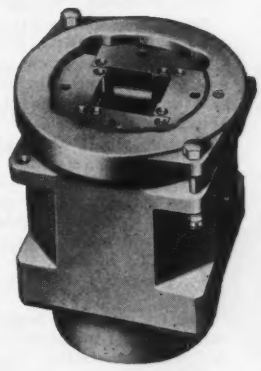
HOSMER AUTOLATCH
BLOWOUT PREVENTER



Designed to control the excessive pressures at Santa Fe Springs, coming with hardly an instant's warning, the Baash-Ross Autolatch is the *fastest* blowout preventer available.

Entirely automatic! Hangs in the derrick, open. A swing . . . locked around the pipe! Drops into place in the body . . . setting a tool joint or coupling compresses the rubber packing ring . . . or may be packed off by *raising* the string of pipe! . . No blowouts have ever occured on wells equipped with the Autolock Blowout Preventer!

BAASH-ROSS ROLLER BEARING
KELLY BUSHING



Eliminating friction between kelly and table, the Baash-Ross Roller Bearing Kelly Bushing is already standard equipment with several major companies.

Table is relieved of weight, drive is steadier, bit control is more positive and accurate, fewer cores are broken.

Wear on kelly and table is much reduced . . . and the greatest cause of strains in wire lines—when the string of pipe sticks momentarily and then drops with a jerk—is eliminated, increasing life of lines.

One size of body, with suitable roller assemblies, does for kellys of 6-inch size and smaller.

BAASH-ROSS CAM PUMPING UNIT
CONSTANT VELOCITY CYCLE*

Slow-speed, constant-velocity cycle* pumping has proved that many wells thought unprofitable *can be pumped at a profit!*

Reasons: Maximum oil recovery of which the well is capable; reduced maintenance cost on equipment; less sand in oil; pulling and cleaning jobs reduced; power cost cut half or more; increased pump efficiency.

The Baash-Ross Cam Pumping Unit is the *only* constant velocity cycle* equipment operating at speeds down to 1.3 strokes per minute. Test data on request . . . coupon below!

**Constant velocity during major portion of stroke; acceleration and deceleration as rapid as mechanically possible and consistent with safe operation.*

TOOL CO.

J&L PIPE B-R

Los Angeles, California
Field Shops equipped for 24-hour supply and mechanical service at Long Beach . . . Brea . . . Ventura . . . Taft

Baash-Ross Tool Co.
Box 1297 Arcade Station, Los Angeles
Send bulletins on following new tools:
☐ Blowout Preventer ☐ Kelly Bushing
☐ Pumping Unit

*Name*_____

Company _____

*Address*_____

Oil and Gas Journal, Oct. 10, 1929

Repressuring in Mid-Continent Field

Paper Prepared as Result of Questionnaire Sent to Operators. Suggested Basis for General Discussion

By David L. Trax[1] and T. A. Hall[2]
[1]Gypsy Oil Co. and [2]Tidal Oil Co.*

The restoration of pressure on depleted oil properties is now passing the experimental stage in the Mid-Continent area, and is recognized as a necessary production method by most operating companies and individuals.

Co-operation in repressuring operations is being carried on quite extensively and satisfactorily where large pools are involved, as it has been recognized that this is one of the essential factors in obtaining successful results. This co-operation is brought about by offset companies using offset pressure wells, introducing the same volumes, and holding the same back pressures. Each company operates their own compressor plant in most cases. However, on many large projects, central plants are installed by companies having large holdings, and compressed air or gas is sold to offset operators at cost. Detail records of repressuring operations are kept by each company, and meetings held at various intervals, and the records compiled in order to show the exact status of the entire project, and to propose any change in operations.

Pressure wells for introduction of repressuring agents are prepared in much the same manner by all companies. In most cases, old wells are used, and cleaned out by the usual method. The repressuring agent is then introduced through the casing or tubing with a packer set somewhere in, or at the top of the oil sand.

Analyses of Cores

The logs or records of old wells are very inaccurate, or of little value in determining the top of the sand, or the pay horizon, so that some projects have failed due to lack of knowledge of sand conditions, resulting in bypassing through barren parts of the sand. Very seldom is a sand body of the same texture, porosity and saturation, from top to bottom. It is not necessarily true that all sands will respond satisfactorily to repressuring, but it is believed that fewer failures would result, and greater recovery obtained if all sands were sufficiently cored, and the cores accurately analyzed before the start of repressuring. Such analyses would show the recovery to be expected, the location of barren or nonsaturated portions of sand, the high and low porosity sections, and the presence of shale partings or laminations. This information in turn would furnish knowledge as to whether repressuring would be profitable, where and how to locate packers, or into what portion of the sand to introduce the repressuring agent to obtain maximum results, and possibly the volume and pressure to use.

Recently it has been found in the Bradford Field of Pennsylvania, where water flooding is practiced, that the method used was very inefficient. By more scientific methods, such as coring and analyzing sand, metering, and introducing water under pressure, into saturated portions of sand, they are able to control the water front and obtain recoveries over 40 per cent of the oil in the sand when the flood started. There is no reason why similar conditions cannot be brought about by the use of more scientific methods in repressuring operations.

Oil Remaining in Sand

It is the general opinion that 60 to 80 per cent of the original oil in the sand still remains after normal methods of production have reached the economic limit. If this be the case, the oil industry should make strenuous efforts by research in the devising of ways and means to obtain as much of this remaining oil as practical.

The maintenance of pressure in flush fields has not been carried on extensively in the Mid-Continent area, but replies to the questionnaire indicate that such procedure is theoretically correct, and that pressure of introduction would be the only limiting factor.

The paper, which has been compiled from replies to the questionnaire, should be a subject of general interest, and it is hoped that you will enter into the general discussion for the mutual benefit of all concerned.

Result of Questionnaire

This paper has been prepared through the agency of sending a questionnaire to each operator in the Mid-Continent district who has had experience in repressuring. Replies were received from 10 companies answering as many questions as they had data upon, or formed conclusions. The answers to each question have been compiled and inserted after each question.

Compressor Plants

1. What is the ideal size, in horsepower, of units?

50-100 horsepower (4); 90 horsepower (3); 180 horsepower (3).

2. Do you prefer one central plant for any given property, or several plants of one unit each operated by pumpers? Why?

Central plants (9); more economical installation, maintenance and operation.

Several small plants (1); lower labor costs when operated by pumpers.

3. Do you have regular operators on your central plants?

Yes (7); no (3).

4. Do you prefer gas or oil engines? Why?

Gas engines (9); more economical installation and maintenance, simplicity of design and operation.

Oil engines (1); less fuel trouble and saves gas for introduction into sand.

5. Do you prefer two or four-cycle engines? Why?

Four-cycle (10); more efficient and greater fuel economy.

6. Do you prefer semi or full Diesel oil engines? Why?

Semi (3); simpler and lower operating costs.

Full (3); more efficient and economical.

No experience (4).

7. Do you consider an engine convertible to either gas or oil fuel valuable?

Yes (9); where air is being used as repressing medium, or a shortage of gas exists.

8. Do you prefer direct connected or belted units? Why?

Direct (10); lower installation and maintenance costs, also greater efficiency.

9. To what maximum pressure do you single stage?

75 pounds (6); 100 pounds (4).

10. What type of intercooler do you use?

Air-cooled coils (5); water-cooled coils (3); inclosed water-cooled coils (2).

11. What type of after cooler do you use?

None used (4); water-cooled coils (4); large diameter pipe, air or water cooled (2).

12. Have you standardized on any plant design for repressuring?

No (7); yes (3), on new plants.

Surface Equipment

13. What size lateral lines do you use to pressure wells?

Two-inch (8); two and one-inch (2).

14. Do you bury the distributing lines?

Yes (7); no (3).

15. Do you paint the distributing lines?

No (8); yes, in some cases (2).

16. Do you use individual separators on producing wells, or pump all wells into the receiving tank?

Receiving tank (10).

18. Do you install a by-pass around the orifice meter flange?

No (7); yes (3).

19. Do you install a permanent recording orifice meter gauge on each pressure well, or take periodical readings with a portable gauge?

Permanent meters (6); periodical readings (4).

20. Do you use manual control or automatic volume controllers for regulating the volume to each pressure well?

Manual control (10).

21. Do you install a check valve on each pressure well?

Yes (6); no (4).

Selection of Pressure Wells

22. Do you use the name pressure, key, air, intake or injection to designate the well used to deliver the pressure medium to the sand?

Pressure (8); key (2).

23. Do you determine porosity and saturation of a sand before making permanent installation in any pool? If so, how is sample obtained?

No (10). Although all answered negatively, three favored such a procedure.

24. Do you locate your pressure wells by subsurface study, or geographically?

Geographically (5); both (5).

25. Do you locate your pressure wells so that the drive will be up structure, or down structure? Why?

Up structure (6); in most cases there is a tendency for repressuring medium to travel up structure.

Down structure (1).

Disregard (3); other factors more important.

26. Do you think all pressure wells should be newly drilled wells for that purpose? Why?

No (7); uneconomical.

Yes (3); old wells have been inaccurately logged, and it is difficult to obtain an efficient drive.

27. Do you place much value on sand thickness, initial production, present production and rate of decline in making selection of pressure wells? Why?

Yes (10); thicker sand provides greater outlet area, initial production and rate of decline indicate porosity or loose sand, so that greater results may be obtained at low pressure. Present production considered from economic standpoint.

28. Do you try to avoid selecting wells which are producing water? Why?

Yes (10); a higher pressure is required to force water into sand and may also cause flooding or a water drive, if excessive.

Drilled Pressure Wells

29. Do you think a drilled pressure well should be cored? Why? Yes (10); in order to obtain information relative to sand porosity and saturation. Also to determine proper casing point or preparation of pressure well.

30. Do you think a drilled pressure well should be shot? Why?

Yes (6); if sand tight and hard, shooting provides greater area for introduction of medium and better distribution.

No (4); shooting has a tendency to create channelling.

31. Do you consider that a well which has been responsive to vacuum will make a good pressure well?

Yes (10); vacuum creates a differential in pressure the same as repressuring, except that by repressuring a greater differential is obtained, therefore greater results.

32. Do you consider that a property or pool which has been responsive to vacuum will result in a successful repressuring proposition?

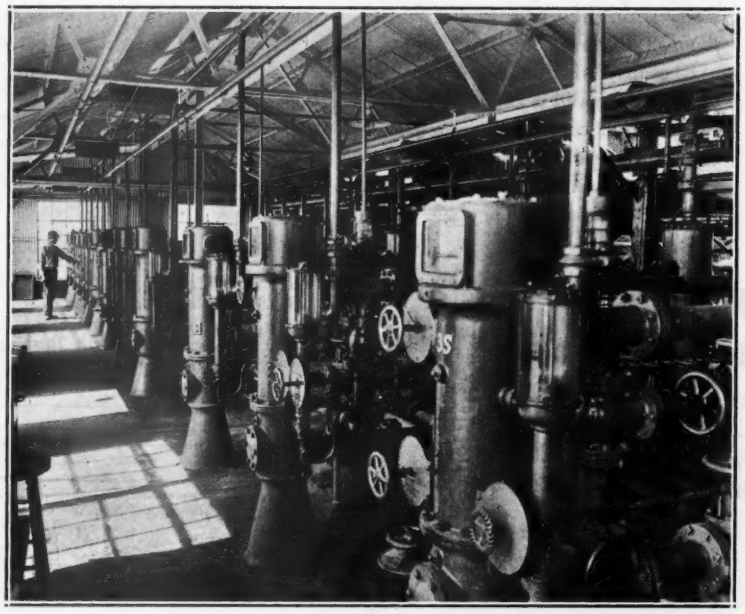
Yes (10); if by-passing can be prevented.

33. Do you make preliminary tests to determine pressures and volumes required for a property?

Yes (7); no (3).

34. What sort of compressor installa-

WELL LIGHTED AND VENTILATED CONTROL HOUSE



Receiving house and control house at the Hynes, Calif., refinery of the Richfield Oil Co.

*Before Mid-Continent District, A.P.I. Division of Development and Production Engineering, Tulsa, October, 1929.

BLACKOR'S

Slow-wearing and fast-cutting qualities make the changing of tools much less frequent

RIGID tests show that Blackor has approximately 10 times the wearing quality of hard-facing materials and is more abrasion-resistant than the average hard metal insert. It forms a solid mass of the toughest abrasion-resistant armor known, which, in combination with its super-hardness, gives the cutting edge longer life and results in fewer changes of bits and more hole in less time.

Blackor is fused direct onto the tool's cutting area by the carbon electric arc. It covers the entire abrasion surface of the tool...leaving no unprotected spots to wear away under abrasive action. No special tools nor skill are required to apply Blackor. Your welder can Blackor your tools at the rate of 1 1/2 square inches per minute.

A trial will convince you!

Blackor is granular in form. Does the work of both hard-facing and insert materials. Always uniform in quality. The genuine abrasive resistor. Packed in convenient 5-lb. water-tight, sealed cans.

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BLACKOR

The Super Abrasion-Resistant Facing

tion do you make for preliminary test?

Portable two-stage compressing unit (9).

Small compressor belted to powers (1).

35. In the selection of pressure wells do you select the largest or smallest producing wells? Why?

Smallest producers (6); less loss of production during time repressuring is becoming effective.

Large producer (2); it has been found that good producers make the best pressure wells from standpoint of efficiency and recovery.

Disregard present production (2).

36. Do you consider sand of high gravity oil more favorable to repressuring than one of low gravity?

Yes (6); quicker and more profitable results are obtained.

No (4); there is no difference in results obtained.

Preparation of Pressure Well

37. What methods do you use in preparing the pressure well to insure the repressuring medium being introduced into the oil-bearing part of the formation?

On old wells, casing is underreamed and cemented on top of sand. Tubing and anchor packing set at break in sand, tubing and shot hole packer set at top of shot hole, tubing and rag packer cemented at top of sand or at break in sand. On new wells, casing is cemented, or set on top, or at break in sand.

38. Is pressure well equipped so that tubing and rods may be run, and the well put back to pumping?

Yes (10).

39. When old wells are used as pressure wells, should they be properly cleaned out and shot?

Yes (10); if hole is filled with mud to top of sand, or if sand is paraffined.

40. What percentage of pressure wells have you put back to producing on account of unsatisfactory service for pressure?

Five per cent (2); two per cent (2); very few (5); none (1).

41. Do you practice changing pressure wells periodically to get cross-drives.

No (7); but believe it is good practice in soft porous sands.

Yes (3).

Input Volume

42. From what operating data do you determine the proper input volume after the whole pool is equipped and operating?

In most cases the proper input volume is determined by performance of the surrounding producing wells, that is the increase of gas or oil from these wells, tendency to channel, etc.

43. How often do you determine pressure well volumes if you do not have a permanent recording meter on same?

Monthly (1); semimonthly (2); weekly (3); depends on property (2)

44. What methods have you used for controlling by-passing through the oil pay? List in order of best results.

Stopcocking or holding gas back-pressure was listed as first by (5); and increasing the fluid level to hold fluid back-pressure by raising tubing or changing stroke on well was listed as first by (5). Other methods listed were reducing input volumes, changing pressure wells, and combination gas and fluid back-pressures.

45. What methods have been successful in preventing by-passing through a top gas sand where there is no break between it and the oil pay?

Only three (3) companies reported on this question. They suggested close spacing of pressure wells with respect to producing wells, or carrying gas or fluid back-pressure on all wells.

46. What are relative values for pressure medium, (1) air; (2) dry gas; (3) wet gas; (4) stabilizer vapors; (5) exhaust gases; (6) hot gas; and (7) hot air as affecting, (1) volume required; (2) efficiency as propelling medium; (3) gravity of oil; (4) corrosiou; (5) gasoline content of casinghead gas; and (6) emulsions?

(1) Air—less volume, lower efficiency, little raise in gravity, increase in corrosion, decrease in gasoline content, more emulsions.

(2) Dry gas—more volume, high efficiency, increase in gravity, no corrosion, slight increase in gasoline content, no emulsions.

(3) Wet gas—less volume, not so efficient, raise in gravity, no corrosion, increase in gasoline content, no emulsion.

(4) Stabilizer vapors—same as wet gas.

(5) Exhaust gases—highly corrosive, therefore condemned.

(6) Hot gas—same as dry gas, possibly more efficient as expelling agent.

(7) Hot air—no advantage over cold air.

47. What have you done to overcome corrosion of pumping equipment?

Alloy and plated equipment used (5).

Chemical introduced into casing of pumping well(1).

No excessive corrosion present (4).

Safety Measures

48. What safety measures have you taken to prevent explosions when compressing air?

Proper kind and minimum amounts of lubricating oil, soap lubricant, install drips on high pressure discharge, use large relief valves, keep compressor valves in good condition, use arresters and automatic temperature shut-down device, have safety rules and use judgment in operation.

49. What safety measures have you taken to prevent explosions when compressing a mixture of air and gas?

Do not compress mixture of air and gas under any circumstances (3).

Make frequent analyses of mixture to determine percentage of air (4).

Use same safety measures as above (3).

50. What minimum percentage of gas do you consider safe to compress with air to 300 pounds pressure?

None (3); as percentage may change at any time due to leakage and cause explosion.

Forty per cent (3); twenty-five per cent (1); sixty per cent (1); no experience (2).

51. How do you measure the casinghead gas volumes?

Orifice well tester (5).

Recording meters (2).

Positive meters (1).

Orifice well tester on some wells, recording meters on others (2).

52. How often do you measure casinghead gas volumes?

Monthly (4); semimonthly (1); weekly (1); daily (2); every two to three months (2).

Air Control

53. Do you use an analyzer for determining the air content of the gas, and do you attach much importance to the data?

Yes (8); it shows rate and direction of distribution, also determines by-passing.

No (2).

54. Do you find your corrosion trouble increases as the CO_2 percentage increases?

Yes (5); No (1); no experience (4).

55. What is your theory as to the formation of the CO_2?

Oxygen combines with hydrocarbons to form water and carbon dioxide (2).

Catalytic action (1).

No theory (7).

56. What do you do with gasoline condensed in aftercooler and lines?

It is drained into drums and hauled to gasoline plant, or used in tractors and automobiles. It is also dumped into casing of producing wells, or forced into sand through pressure wells.

57. How do you make individual oil and water tests?

Permanent test tanks (5).

Portable test tanks (3).

Gauge in flow tank (1).

Estimate from pumping time (1).

58. How often do you make these tests?

Monthly (4); quarterly (1); semiannually (1); weekly (3); semimonthly (1).

Maximum Tests

59. If you are not producing your wells to capacity, do you periodically make maximum tests, and how often?

Produce to capacity (9).

Periodical tests made once a month (1).

60. Do you find that your pulling increases from the application of air?

Yes (5); no (2); in some cases (3).

61. Do you find that your operation and maintenance increases sharply with application of pressure and then gradually reduces?

Yes, in most cases (6), probably due to increased activities on properties.

No (4).

62. When a vacuum property is repressured, do you eliminate the vacuum entirely at any specified time, continue the vacuum, or gradually reduce the vacuum as the drive becomes effective?

Gradually reduce (7); in order to prevent loss of gas and oil production.

Eliminate at once (3); in order to prevent channeling and obtain quicker results.

63. Do you shut down all producing wells until drive has had an effect or do you try to get all the production you can from the beginning?

Produce all we can from beginning (9).

Control production according to distribution of pressure medium (1).

64. Do you try to increase production rapidly from the beginning, or do you start with volumes even less than preliminary tests show and gradually increase as you note the effect?

Increase production slowly, using small volumes and gradually increasing (10).

65. What do you do with water or oil in a pressure well before turning in pressure?

Force into sand (7); bail, swab or flow out (3).

66. In what order do you notice increases in water, oil and gas?

Gas, oil, water (7); water, gas, oil (1); gas, water, oil (1); oil, gas water (1).

Offset Operators

67. What various operating agreements do you have with offset operators?

In most cases co-operation is practiced, using offset pressure wells and introduce same volume into each well, holding same back pressures on producing wells. Drill new wells on line and prorate expenses. Buy and sell compressed air or gas for introduction on offset properties.

68. How close to your property line do you locate pressure wells if the offset operator does not join in repressuring?

Two locations (9); unless high part of structure on property, if so, locate pressure well on line. One location (1).

69. Have you had any success in preventing migration of oil from your lease by pulling vacuum on line wells offset by wells on which vacuum is maintained?

Yes, in some cases (7); no (3).

70. What other methods other than pumping are you using to operate the producing wells?

None (6); automatic flowing (4).

71. Considering depreciation, operation and maintenance on plant and lines, what is your compression cost per 1,000 cubic feet, at 100 pounds, 200 pounds, 300 pounds, and 400 pounds?

100 pounds, .03 to .045.

200 pounds, .04 to .05.

300 pounds, .06 to .065.

400 pounds, .07 to .08.

72. Will repressuring retard water encroachment?

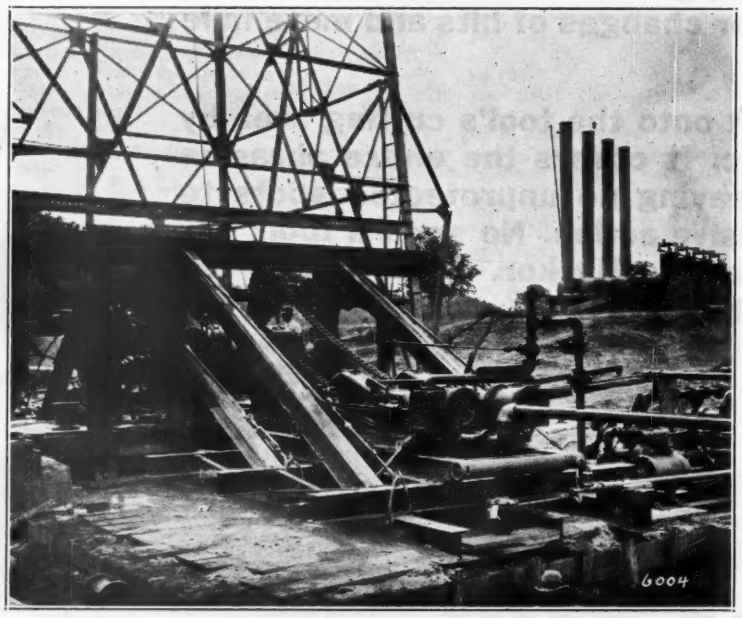
Yes (9); in some cases (1).

73. Have you shut down all producing wells and continued to operate the plant, for any length of time, in an effort to build up the rock pressure? For how long, and what were the results?

No (5); yes (2); three months, no results. Yes (3); three months, slight

(Continued on Page 202)

STEEL FRAME FOR MOUNTING STEAM ENGINES



With the advent of the heavier pieces of equipment used around the rotary and cable tool wells of today the problem of handling machinery has become one of utmost importance for time is the essence of the operation of erecting and removing drilling apparatus.

The American Well & Prospecting Co., of Beaumont, Tex., which has pioneered with new ideas of rotary rig equipment, is now offering a steel frame made out of structural shapes for mounting the steam engines used with the rotary and cable tool outfits.

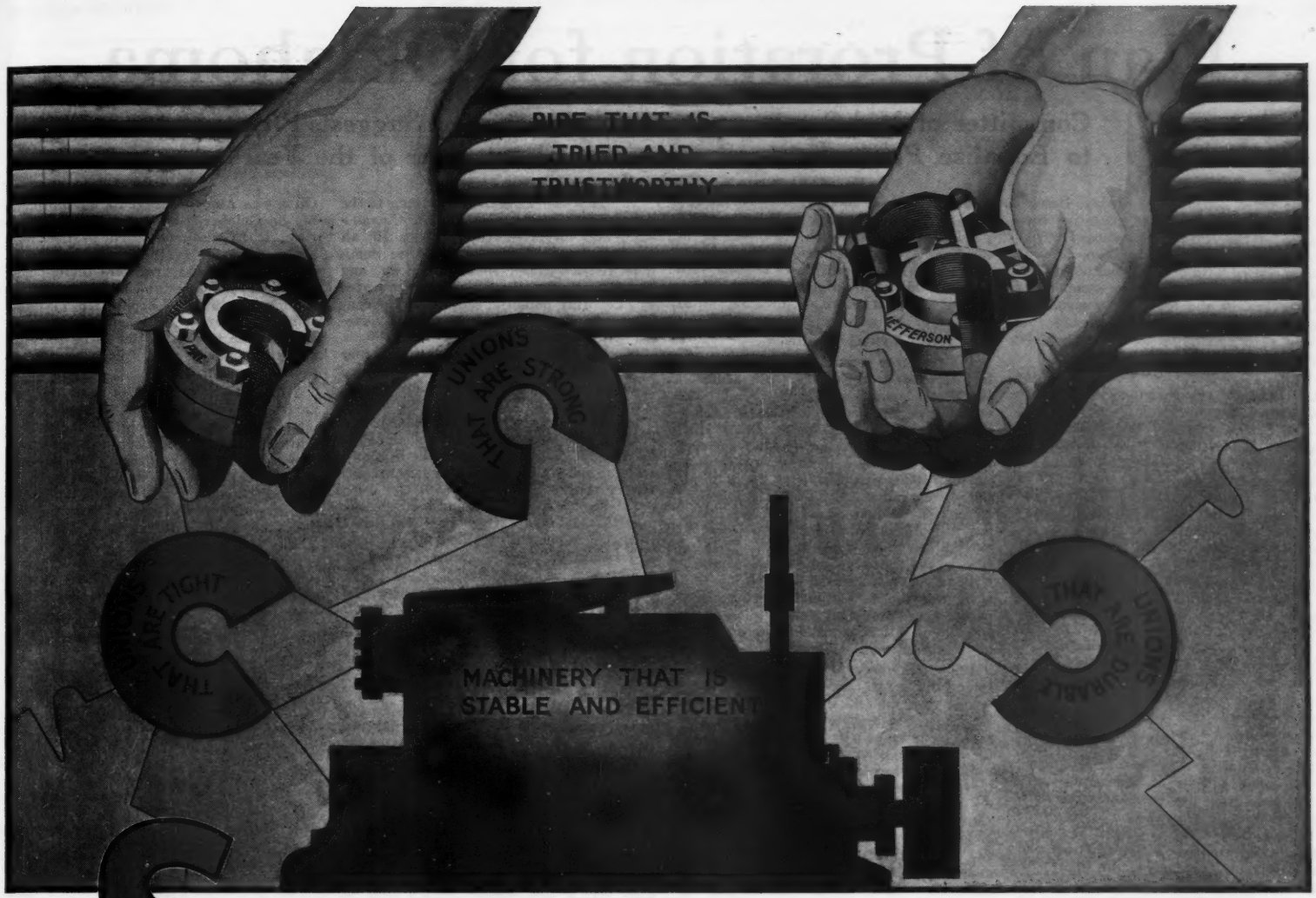
This steel frame is so designed and constructed as to permit of its being set upon concrete foundation and the lower members or sills being bolted to the concrete mass by the use of foundation bolts suitably placed and the cross members are in turn bolted to the sills and the engine mounted upon skids that are in turn bolted to the cross sills.

The cross sills serve two purposes: first to form a base for the engine skids and second, to create a buttress or support against which the braces for the drawworks headboard and posts can rest.

By the use of tension members over these diagonal braces the drawworks is held securely in place and as the whole steel structure is firmly bolted to the concrete foundation this saves a lot of wear and tear on chains and machinery that is usually quite costly.

This form of base is estimated to save at least one-half of the rigging-up time for the drilling crew and likewise it will save very materially in time when the rig is being standardized and the cable tool equipment put in place after the rotary outfit is removed.

This equipment is being used in the Oklahoma City Field by Harry Franklin of the Capitol Drilling Co.



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Jefferson Unions are manufactured from air-refined, Certified Malleable Iron, made in our own foundry. The finest grade of brass goes into the seat rings. Seat rings are located in a recess, away from the runway of the fitting, thereby protected from abrasion and corrosion. Ground ball, brass to iron joints, ground in pairs, eliminate need for gaskets. Coarse threads, heavily graphite coated. Spherical joints, with play between nut and swivel end, make Jefferson Unions by far the easiest to apply. Jefferson Unions are produced by a company that has long specialized in the manufacture of unions and flanges.

Furnished with iron to iron joints, (as well as brass to iron) at no extra cost, when specified for use in oil fields where a highly corrosive condition exists.

Handled By All Leading Oil Industry Jobbers

JEFFERSON UNION COMPANY
Lexington, Mass., U.S.A.

JEFFERSON

Plan of Proration for Oklahoma

Committee of Mid-Continent Oil & Gas Association Suggests Plan to Equalize Production and Demand in Remainder of the Year

For three hours on Thursday, October 3, a subcommittee of the executive committee of the Kansas-Oklahoma Division of the Mid-Continent Oil & Gas Association wrestled with the problem of equalizing Oklahoma production to demand and at the end of the long and serious discussion the committee was able to submit a plan calculated to accomplish desired results.

C. C. Herndon, vice president of the Skelly Oil Co., is chairman of the subcommittee, but in his enforced absence, W. G. Skelly, president of that company, represented Mr. Herndon at the meeting. Others present and taking part in the discussion were Jams A. Veasey, Carter Oil Co.; Wirt Franklin, Wirt Franklin Petroleum Corp.; Burdette Blue, Indian Territory Illuminating Oil Co.; R. A. Griffith, Sinclair Oil & Gas Co.; J. S. Sidwell, Prairie Oil & Gas Co.; M. J. Kirwan, Empire Oil & Refining Co.; W. N. Davis, Phillips Petroleum Co.; Harry H. Smith, secretary of the Mid-Continent Oil & Gas Association, and C. D. Mapes, petroleum economist, Mid-Continent Oil & Gas Association.

Following the meeting Chairman Herndon submitted the following report to the executive committee which will meet this week and the whole subject will be further acted upon at the annual meeting of the association in Tulsa on October 9:

Recommendations of Subcommittee

The resolution appointing this committee provides as follows:

"Resolved that we commend the operators in the Oklahoma City district and the East Earlsboro district for their willingness to practice conservation, as evidenced by local plans recently adopted by them, and that this association go on record in favor of a statewide program of limiting production from large flush wells wherever located.

"It is further resolved the president of the Kansas-Oklahoma Division be authorized to appoint a committee of five to suggest a general plan of curtailment of flush areas, determining from time to time the areas to be affected and making suggestions in specific cases, which plan shall be reported to this association at an early date."

Your committee reports that, pursuant to said resolution, we held two meetings at which the producing situation in Oklahoma was considered and a full discussion had upon information then available. This committee assumes at the outset that every oil producer in Oklahoma is aware of the fact that there is a serious condition of overproduction of crude oil and that Oklahoma threatens to be, if it is not already, a serious contributing factor to this generally overproduced condition.

Your committee estimates that, in the absence of proration or curtailment, the production in Oklahoma will average approximately 800,000 bbls. per day during the period from October 12 to January 1, next; that the probable demand for Oklahoma crude during that period will be an average of 660,000 bbls. per day, thus leaving an excess of 140,000 bbls. of production which must be held back from current output by curtailment in some form if an approximate balance is to be maintained between supply and demand.

The situation therefore calls for immediate action if demoralization and economic waste during the winter months are to be avoided. At this time there is a shutdown order in effect in the Oklahoma City Pool which expires October 12 and a proration order in effect in the East Earlsboro Pool expiring on November 2. This committee would not recommend any change in those existing orders for the reason that they have been carefully worked out by the producers concerned and probably represent the best solution in those individual cases for the time being. But from information supplied this committee, we are of the opinion that these restrictive orders now in effect will not be sufficient to hold production down to consumption requirements either in point of duration or in amount of reduction of output.

Extend Proration

We therefore recommend that proration be extended to the other flush areas in the State, comprising Logan County, the entire Greater Seminole district, Allen, Sasakwa, and the Pearson-St. Louis area. This general proration should be contemplated for a period extending to January 1, 1930, with provision for a meeting of operators at Tulsa on Tuesday, December 17, to consider the then existing production situation with a view to extending the curtailment program throughout the remainder of the winter.

Your committee is of the opinion that time proration is distinctly preferable to percentage proration and should be adopted in all cases where the situation in any given pool will permit.

Under whatever plan is adopted, your committee is of the opinion and recommends that the Oklahoma City and East Earlsboro Pools should be subjected to a rate of curtailment twice as great as that to which the other pools in the restricted area are subjected, this for the reason that Oklahoma City and East Earlsboro are the pools which constitute the most active present menace to the maintenance of a balance between supply and demand and are the pools from which the largest immediate increase of production may be expected. Specifically, the committee would recommend:

Recommendations

1. That since the shutdown order in the Oklahoma City Pool expires on October 12 and there has been a general understanding that immediately thereafter the producing wells in that area would be released in order to enable the operators to obtain some production in order to equalize their situation with other pools which have been producing during the 30-day shutdown, it is suggested that the Oklahoma City Pool be opened up at that time and be permitted to produce to capacity until and including October 31.

2. That at an effective date, to be determined by the Corporation Commission, but not later than October 15, all wells in Logan County, the entire Seminole district, Allen Dome, Sasakwa, and the Pearson-St. Louis area be prorated by curtailing potential output 20 per cent from said date until and including October 31.

3. That the present proration order of 50 per cent effective in the Earlsboro Pool be extended to and including October 31.

4. That during the month of November, the Oklahoma City Pool and the East Earlsboro Pool be curtailed 40 per cent and the remaining areas above mentioned 20 per cent.

5. That during the month of December, the Oklahoma City Pool and East Earlsboro Pool be curtailed 50 per cent and the other pools above mentioned 25 per cent.

It is the opinion of your committee that these percentage figures will be necessary to accomplish the reduction of 140,000 bbls. per day in daily average from October 12 to January 1, 1930, and to bring about an approximate balance between production and consumption of crude petroleum in this State.

This plan contemplates and depends upon a continuance of the delay upon the bringing in for production of wells hereafter completed in each of the restricted areas and we suggest that on any basis of proration that may be adopted to curtail production, the drilling wells be prorated an equivalent amount of time, computed from the beginning of proration in each pool. In computing the amount of time that a well should remain shut in after cementing, or landing the final string of casing, the accumulated shut in time and accumulated equivalent time resulting from pinching of producing wells in the particular field should be added in determining the time that drilling wells that may otherwise be completed on a certain date should be shut down, so that drilling wells will get no advantage over producing wells. This delay upon the completion of wells should apply not only to wells now drilling but also to all wells started prior to January 1, 1930.

Your committee recommends that this plan be submitted to the Mid-Continent Oil & Gas Association at its annual meeting on October 9 and that, in the meantime, it be also submitted to the operators interested in the various pools affected, so that the operators therein may consider the same and arrange for its submission to the Corporation Commission, if approved. This committee deems early action in this matter to be essential and that some such plan should be promptly put in force.

Your committee submits with this report a form of resolution to approve the plan and a general resolution for consideration of the association calling attention to the excessive drilling and wildcat development work now under way in Kansas and Oklahoma, and urging the policy of refraining from such wildcat drilling and other drilling that can by any possibility be avoided, and of avoiding the purchase of spreads of acreage in or about new development projects where pooling arrangements or unitization have not been put into effect.

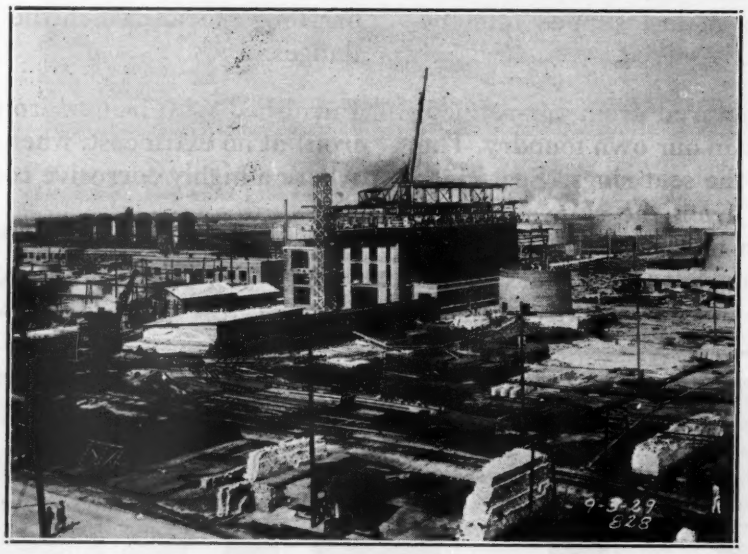
Proration and Production

The following tables show the suggested proration percentages and an estimate on the production of Oklahoma, potential and real, from the present until the closing month of the year:

Proration:	Per cent
Sept. 12 to Oct. 12	100
Oklahoma City:	
Oct. 12 to Nov. 1	None
Nov. 1 to Dec. 1	40
Dec. 1 to Jan. 1	50
East Earlsboro:	
Sept. 28 to Nov. 1	50
Nov. 1 to Dec. 1	40
Dec. 1 to Jan. 1	50
Seminole et al:	
Oct. 12 to Nov. 1	20
Nov. 1 to Dec. 1	20
Dec. 1 to Jan. 1	25
Proration Percentages Applied	
Estimated daily average production, Oct. 12	665,000
Potential daily average production, Oct. 12-31:	
Oklahoma City	77,850
East Earlsboro	69,000
Seminole et al	370,000
Rest of State	270,000
Total	786,850
Estimated prod. under proration:	
Oklahoma City	77,850
East Earlsboro	34,500
Seminole et al	296,000
Rest of State	270,000
Total	678,350
Potential daily average production, November:	
Oklahoma City	95,500
East Earlsboro	75,000
Seminole et al	360,000
Rest of State	275,000
Total	805,500
Estimated production under proration:	
Oklahoma City	57,300
East Earlsboro	45,000
Seminole et al	288,000
Rest of State	275,000
Total	665,300
Potential daily average production, December:	
Oklahoma City	110,000
East Earlsboro	85,000
Seminole et al	360,000
Rest of State	275,000
Total	830,000
Estimated production under proration:	
Oklahoma City	55,000
East Earlsboro	42,500
Seminole et al	270,000
Rest of State	275,000
Total	642,500
80-day daily average production (estimate under proration as above)	660,000

In the course of the discussion on the plan J. S. Sidwell of the Prairie Oil & Gas Co. and William G. Skelly of the Skelly Oil Co. spoke strongly in favor of a general Sunday shutdown in all Oklahoma fields and this question will come up for further discussion as both the Prairie and the Skelly companies are strongly in favor of it. The most serious objection to its general application is the effect of such action on gas pressures and on natural gasoline manufacture.

NEW POWER HOUSE AT GULF REFINING CO.

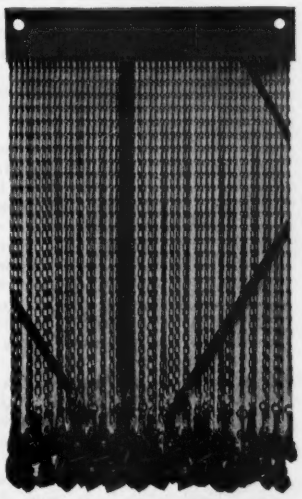


No. 3 power house being built at the Port Arthur, Tex., plant of the Gulf Refining Co. Note start of the large brick stack in the foreground.

One trip up
One trip down [↑ ↓]

instead of

[↑ ↓ ↑ ↓] Two trips up
Two trips down



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Development in Science of Geophysics

German Scientists and Manufacturers Are Busy With This Subject. Most of Work Being Done in Foreign Countries

By Dr. C. A. Heiland
Professor of Geophysics, Colorado School of Mines.

During my recent visit to Germany I had an opportunity to study the developments which have taken place in the science of practical geophysics in the last few years there. It may be of interest to the readers of this journal to get a picture of the present situation.

The general conditions in respect to geophysical prospecting may be characterized with a few words. The number of prospects which might be tested by geophysical methods is comparatively scarce; first, because the major part of the country has been thoroughly covered by geological surveys and secondly because the financial burden placed on the German industry by a lost war does not allow even the larger companies to spend appreciable sums on exploration work. In addition, an oil industry that would favor the development of geophysics as it did in this country is wanting as compared with the extent of the oil business in the United States.

Consequently, geophysical consulting companies of Germany are doing about 90 per cent of their work in foreign countries. German manufacturers of geophysical instruments ship their products chiefly to foreign countries, or supply consulting companies, which in turn use the apparatus abroad. Many scientists teaching geophysics, physics or mathematics in German universities or technical schools are connected, in a consulting capacity, with the manufacturers of instruments, the consulting geophysical companies or foreign oil companies and are thus working on problems of foreign countries. A great portion of Germany where geological methods alone have hardly a chance of success or would necessitate immense drilling operations and, which, therefore, is specially well adapted to the application of geophysical methods, the North German Plain, is surveyed systematically by the State Geological Survey ("Geologische Landesanstalt") which has its own department for geophysical prospecting and co-operates in these surveys with a number of companies which are interested in possible salt, coal, oil and ore deposits in these areas, for which, however, the maintenance of their own geophysical department or extensive contracts with consulting companies would be too expensive.

A further consequence of such conditions is that the profession of consulting geophysicists is altogether wanting and that educational institutions have taken no steps as yet to establish regular departments for theoretical and practical instructions in various methods of prospecting such as has been done by the Colorado School of Mines. There are universities which offer occasionally courses in the theoretical phases of individual methods or in applied geophysics as a whole, but a young man has a chance of using instruments only if his professor happens to be connected with a consulting geophysical company, the State Geological Survey or another state institution which has geophysical instruments, or else, provided that he joins a geophysical consulting company himself after having received his theoretical training.

In the following I shall try to describe briefly the present activities (1) of the state institutions or scientists connected with such institutions, (2) of the geophysical consulting companies, (3) of the manufacturers of geophysical instruments.

Activities of State Institutions

The geophysical department of the State Geological Survey is directed by Doctor Kuehn. With him are working the geologists, Doctors Barsch, Reich, Kohl, Kegel and Ebert. As far as the author knows, the department has one torsion balance, three magnetometers, three seismographs and some electrical equipment.

Torsion balance work has been done in the last year in Hanover near Isernhagen-Burgwedel to investigate an uplift of lower Cretaceous strata; near the city of Bremen to outline a supposed salt dome; in the Lueneburg Heath to find the buried extension of the Flechtinger ridge. Most of this work was carried over to the present year. At Gross Ilsede, attempts were made to find the southern edges of a Cretaceous syncline and to determine the influence of iron ores in that area upon the torsion balance. A detailed survey of the salt dome of Schoenebeck near the Elbe River was made. For this year, further measurements near Calbe and Milde are contemplated to determine if a triassic uplift is related to a salt dome. Seismic investigations were made in the past year near Husum (Sleswig) and Priegnitz (Brandenbourg) to determine the depth of the supposed basement which is assumed to produce the great magnetic and gravity anomalies in these areas. In southern Brandenbourg near Dobrilugk attempts were made to determine the depths of the carboniferons and to investigate in this connection theoretical problems related to the interpretation of travel time curves. For this year, seismic work in Pomerania is contemplated to determine the depth of the basement which is assumed to cause the magnetic anomalies near Lebasee. Extensive magnetometer work was done last year to investigate in further detail the great number of magnetic anomalies that accompany the coast of the Baltic Sea, e.g. at the lower Elbe River and in East Pomerania from Koeslin to the border. The measurements in Sleswig are to be continued this year especially in order to find possible relationships between magnetic anomalies and movements of the coast. Magnetic investigations on Mid-German structures were made in the Harz Mountains and the surrounding plains. German geologists still maintain the hope of finding salt domes magnetically. For the further study of the magnetic effect of salt domes, measurements were made on Hanover domes near Peine, and at Tiefenort on the Werra River. These tests are to be continued this year. The applicability of magnetic prospecting to various other prospects of economic importance was investigated, as for instance at the hematite and magnetite ores in the Lahn-dill district and in the adjoining Westerwald area, where the problem was to differentiate magnetically between extrusive flows and intrusions of basalt. A similar type of work is contemplated for this year, the magnetic investigation of tuff-covered lava flows near Neuwied. Experimental work for determining effects of known deposits on electrical prospecting methods was done in the past and continued this year on the Rammelsberg and other Upper-Harz dikes; in connection with this work, attempts will be made to locate the extension of a series of dikes of the Hermanns-Mine near Allendorf (Westphalia) electrically. Electrical prospecting on the triassic lead-zinc ores in upper Silesia is proposed for this year. Several mineralized Harz dikes were also tested by radioactive methods.

Two Other State Institutions

Next to the State Geological Survey, there are two other state institutions actively engaged in geophysical prospecting; the Geodetic Institute and the Magnetic Observatory in Potsdam. The Geological Survey has entered into a close co-operation with both institutions. The Geodetic Institute has been engaged for years in the theoretical and practical perfection of pendulum observations and has carried out surveys on various occasions in co-operation with the State Geological Survey at places, where geologists connected with the latter had deemed pendulum measurements of particular economic importance either for geologic reasons (as for instance the tracing of a possible connection between the Westphalian and Silesian carboniferous below the North German Plains) or else where magnetic anomalies has been found. Doctor Schmehl of the Geodetic Institute is reported to do such field work with pendulum apparatus at the present time. The Geodetic Institute also contemplates torsion balance measurements in Pomerania where great magnetic anomalies had been found. About half a year ago, Professor Angenheister who was in charge of the geophysical department of the Geodetic Institute was appointed successor of Professor Wiechert in Goettingen. Doctor Haalck, previously with the "Exploration," is now director of this department and works at present primarily on the relationship of gravitational and magnetic anomalies and the magnetization of continents and oceans. At the Geodetic Institute, recently the problem was investigated whether the use of a gravity pendulum as variable capacity in a radiofrequency circuit for the transmitting of the pendulum beats has any detrimental influence on the period of oscillation. It was found that the influence is smaller than the middle error (one ten-millionth of a second). Thus it will be possible to transmit the oscillations of the reference pendulum by wireless to the field stations in relative gravity work by a comparatively simple wiring arrangement which is described in more detail in a recent issue of the "Zeitschrift fuer Geophysik." The recent developments in radio time transmission and the corresponding increase in accuracy have increased the interest in pendulum observations made on floating supports of any kind, the latter being of importance for the location of structures and salt domes in shallow water inaccessible to other geophysical methods. It may be well to call attention, in this connection, to a recent bulletin published by the well known scientist Vening-Meinesz who perfected the pendulum observations at sea, entitled, "Theory and practice of pendulum observations at sea."

Observatory in Potsdam

The Magnetic Observatory in Potsdam is likewise much interested in geophysical prospecting. The magnetic field balances designed by Professor Schmidt, formerly director of this institute, are known the world over. Professor Schmidt retired in the past year and Professor Nippoldt was placed in charge of the institute. A number of changes are contem-

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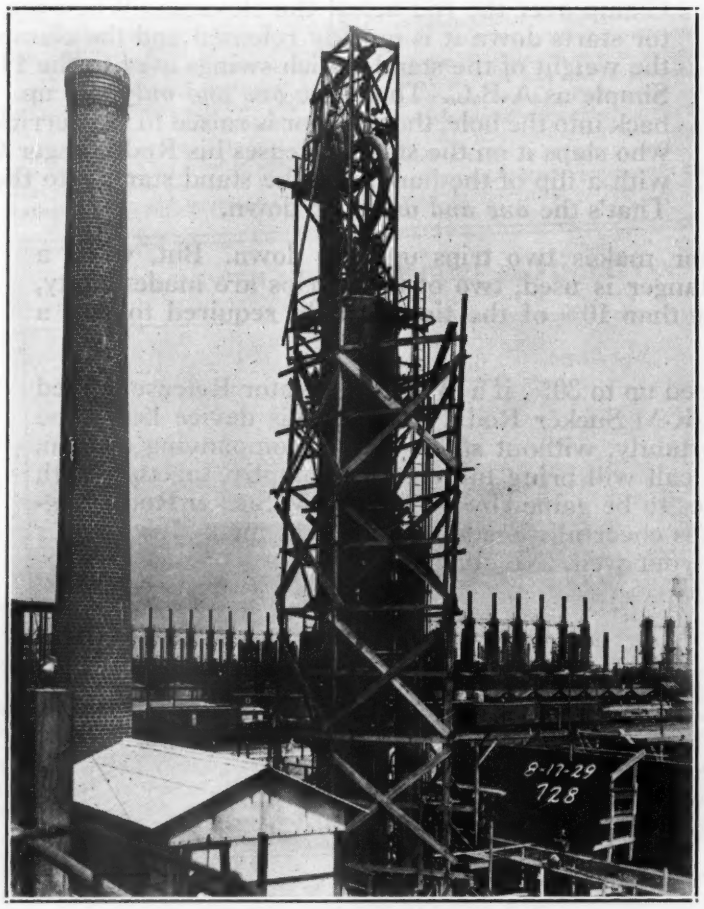

New tube still under construction at the Gulf Refining Co.'s plant at Port Arthur, Tex.

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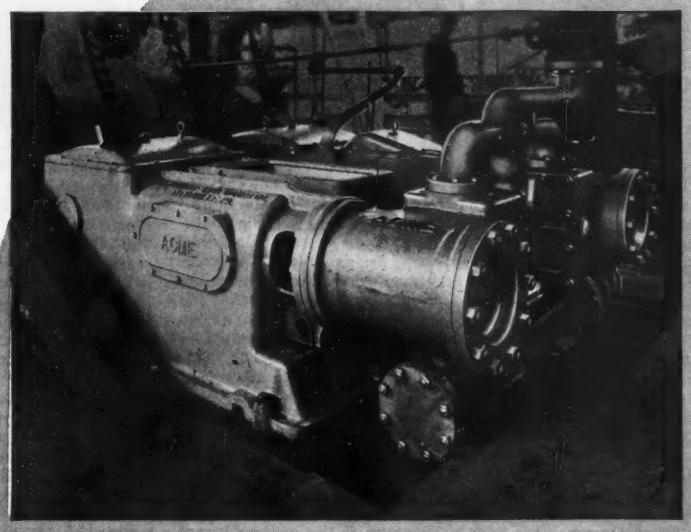

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plated or are being made at present in the arrangement of the institution. This was primarily due to the fact that with the electrification of the interurban line Berlin-Potsdam the registration of the magnetic components in Potsdam had to be discontinued altogether, which so far constituted a control system for the main recording station Seddin. The main station is now shifted to Niemegk; instruments with many improvements, primarily for the simultaneous visual observation and automatic registration are being built for this station and the majority of the staff is busy with work related to this new observatory which is to be put in operation with as little delay as possible. Professor Nippoldt contemplates to record not only the X, Y, Z components at Niemegk, but to have an auxiliary recording system for D, H and J as these are the magnetic elements that are most frequently measured in magnetic surveys. The removal of the recording instruments from Potsdam made a number of rooms available for other work. Professor Nippoldt contemplates the installation of a geomagnetic laboratory, especially for testing the susceptibilities of rocks and minerals in their present condition as well as the behavior of the magnetic properties of rocks at different temperatures.

In the investigation of such problems the Magnetic Observatory will co-operate with the Geophysical Laboratory of the Carnegie Institution at Washington and the German State Geological Survey. In the house for absolute observations in Potsdam, the Magnetic Observatory has recently installed an instrument for the electrical determination of the horizontal intensity and a large magnetic universal theodolite the chief object of which is to allow the determination of the mutual influence of magnets in arbitrary positions. Professor Nippoldt has recently completed a map of Europe showing the magnetic anomalies in vertical intensity and he and Doctor Reich have discussed, by means of this map, the relations of magnetism to geologic structure. Professor Nippoldt is now working on a similar map for India. It may be mentioned in this connection that the Department of Geophysics of the School of Mines is also working on a map of the vertical intensity-anomalies for the United States and Canada. Professor Nippoldt is doing extensive computations for graphs which may be used in the interpretation of magnetic anomalies. He is also preparing a chapter on earth's magnetism and magnetic prospecting for the second edition of the textbook by Prey, Mainka and Tams, "Einfuehrung in die Geophysik." Doctor Bock of the observatory is determining permeabilities of various substances by means of an oscillatory Lechner system; he has also made theoretical inquiries into the homogeneity of the field of Helmholtz-Coils. These investigations were continued by Doctor Fanselau, who has computed a number of arrangements of coils, by means of which the homogeneity of their magnetic field may be considerably increased without having to take the great dimensions which were required previously for obtaining a homogeneous field. The magnetic observatory is cooperating with the department of research in terrestrial magnetism of the Carnegie Institution in Washington in the construction of a compass variometer.

Institute in Goettingen

The Geophysical Institute in Goettingen has attained world fame through the work of Professor Wiechert and his associates in seismological theory and the construction of seismic apparatus. Professor Wiechert took a great deal of interest in the observation of artificial explosions and in seismic prospecting; he co-operated with Professor Montrop of the Seismos Co. and with Spindler and Hoyer, manufacturers of all kinds of seismographs for the recording of earthquakes and explosions. After the death of Professor Wiechert last year, Professor Angenheister took charge of the institute and has done a great deal of work related to vibrations produced by traffic and explosions. For transmitting and receiving regular time signals the institute operates its own radio station. In addition to its regular meteorologic and seismic apparatus the institute owns a number of portable seismographs of various designs for the recording of explosions, and also some devices for the registration of sound. In co-operation with the Geophysical Institute, Doctor Mothes has made and is now making determinations of the thickness of glaciers with the seismic method. Professor Angenheister is editing the two volumes on pure and applied geophysics of the new "Handbuch der Experimentalphysik" and is editor of the "Zeitschrift fuer Geophysik."

The "Reichsanstalt fuer Erdbebenforschung" in Jena, under the direction of Professor Hecker is also taking active interest in the applications of seismology. Professor Hecker has developed a seismo-acoustic method of seismic prospecting, which is being applied by the "Elbof" geophysical company, for which Professor Hecker is consultant. The Jena Institute has recently published a pamphlet of 77 pages on seismic prospecting; Dr. O. Meisser is its author.

The departments of mine surveying of the School of Mines in Aachen and of the University in Breslau are engaged in geophysical prospecting. The heads of these departments, recently appointed, are Professor Berroth in Aachen, and Professor Mintrop in Breslau. Professor Berroth was formerly with the Geodetic Institute at Potsdam. Professor Mintrop has maintained his connections with the "Seismic" company. Professor Berroth is engaged in pendulum work for the "Exploration" Co. which was taken over by the "Seismos" some time ago, and is at present in the United States.

Professor Mainka, formerly with the "Erda" Geophysical Co. in Goettingen, has been appointed director of the "Oberschlesische Erdwissenschaftliche Warte" in Ratibor, Upper Silesia. He is the editor of the "Sammlung Geophysikalischer Schriften" in which the books of Doctor Haalck on magnetic prospecting, of Doctor Heine on electrical prospecting and others on pure geophysics have been published.

Professor Gutenberg who is with the University of Frankfurt and who has recently edited and written part of the "Lehrbuch der Geophysik" is now editor and co-author of the "Handbuch der Geophysik." This manual on the entire science of geophysics will probably contain about 10 large volumes, one or more of them to be devoted exclusively to geophysical prospecting. The chapter on gravitational prospecting will be written by Professor Ansel and others, the chapter on seismic prospecting by Dr. O. Meisser and others, that on electrical prospecting by Dr. H. Hunkel, that on magnetic prospecting by the writer. Professor Gutenburg has recently conducted some seismological investigations, the results of which are of importance for seismic prospecting. They concern the use of Galatzin pendulums for the registration of nearby earthquakes or explosions and the propagation of elastic waves in viscous media. Professor Gutenberg will follow an invitation of the Carnegie Institution and will come to the United States this fall. He will visit Canadian and American institutions engaged in seismology in the East but will spend the major part of his time in Pasadena working on California earthquake problems.

Conducting Research Work

Professor Schweydar, who was Professor Angenheister's predecessor in charge of the geophysical department of the Geodetic Institute in Potsdam, has been engaged for the past years primarily in the interpretation of torsion balance and seismic observations, the construction of new torsion balances and seismographs and the design of various apparatus for the graphical interpretation of torsion balance results. He is consultant for the Askania-Werke and the Shell Oil Co. He will be in the United States this fall to direct torsion balance and seismic measurements for the latter. Professor Schweydar has designed the two-component mechanical seismographs manufactured by the Askania-Werke. As the horizontal pendulum in many cases shows smaller amplitudes of the first impulses in the seismogram, the use of this pendulum has been criticised in the recent American literature. In discussing this criticism Professor Schweydar stated that according to his experience the impulses of waves that arrive later than the first longtiudinal wave show much better in the horizontal than in the vertical component, and that also the first impulses are very pronounced if the surface layers are hard.

At the University of Freiburg, Professor Ansel of the Mathematics Department and Professor Koenigsberger of the Department of Physics are doing geophysical work. Professor Ansel has returned from the United States some time ago, where he was consultant with the Seismos Co. for seismological and gravitational work. I discussed with him among other matters the possibility of reducing the dynamite charges in seismic prospecting by using seismographs with very great magnification. He stated that according to his experience it is impossible to get any energy into the ground by too small charges; seismographs with too great magnifications will, of course, register a vibration, but such impulses will in most cases be produced by the waves traveling in the surficial layers; impulses due to the sought subsurface discontinuities will not show. Professor Ansel is working on part of the volume on geophysical prospecting of Gutenberg's new manual on geophysics. Professor Koenigsberger's work is concerned specially with problems of magnetic and electric prospecting. He has devised recently a simple method for the determination of the magnetic properties of rocks.

Electrical Prospecting

Professor Koenigsberger is consulting geophysicist for the "Elbof" electrical prospecting company and has conducted several months ago resistivity measurements on an oil deposit with this company, which seemed to prove that on that location the oil could actually be located directly by electrical methods. Asked about his opinion of the possibility of locating oil directly, Professor Koenigsberger stated that according to the results of theoretical and practical investigations this is possible, provided that the section of the deposit in the direction and at right angles to the current lines is at least one-third to one-half of the depth of the deposit. Most recent surveys have shown that it is not only the section of the oil deposit proper that affects the current distribution. The gas that occurs wih the oil penetrates—the degree of penetration depending on the permeability of the strata—the overlying formations and decreases their conductivity appreciably (owing to the fact that the gas displaces the moisture). Thus a comparatively thin oil deposit may be located electrically, provided that its gas pressure has reduced the conductivity of the surroundings within a sphere great enough as compared with depth. Professor Koenigsberger is also investigating the elementary pulsations of the earth's magnetic field by means of the electrical currents induced by them in loops. Professor Koenigsberger uses amplifiers to increase the amplitudes and to determine the different periods that constitute the oscillations.

Doctor Errulat, who is in charge of the seismologic station at Gross Raum near the University of Koenigsberg, has recently published a book on the "Methoden der Erdbebenforschung" which contains also a chapter on seismic prospecting.

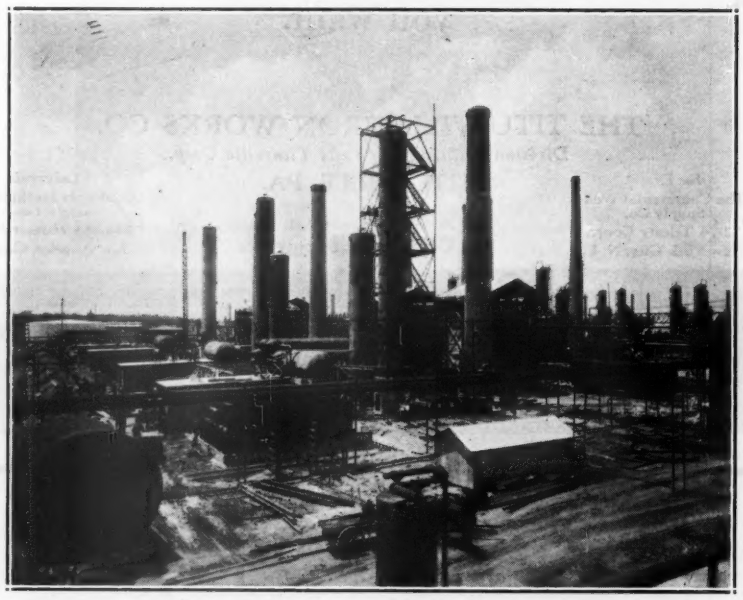
Literature on Geophysical Prospecting

In concluding this paragraph on the activities of scientific institutions and individuals engaged in geophysical prospecting, I may add where the scientific literature on prospecting in Germany is published. There is a geophysical society consisting not only of German, but also of foreign individuals and institutions interested in pure and applied geophysics. This society holds technical meetings once a year and publishes the "Zeitschrift fuer Geophysik" mostly in eight issues a year. This journal is of special value through its very complete lists of international literature and reviews of geophysical articles. The journal contains mostly German articles. Another important geophysical journal is "Gerlands Bietraege zur Geophysik" which is published in Leipzig, under the editorship of Professor Conrad in Vienna, mostly in four to six volumes a year. This journal often carries articles in English and French. A brief statement of its content in English, French and German precedes each article. The content of each volume is summarized in Esperanto. References to new literature and reviews are appended to each volume.

The textbooks on geophysics written in German are: (1) Prey, Mainka and Tams: Einfuehrung in die Geophysik; (second edition is in print. (2) Gutenberg and others: Lehrbuch der Geophysik (5 sections). (3) Ambronn: Methoden der angewandten Geophysik (Elements of Geophysics). (4) Gutenberg and others: Manual of Geophysics (about 10 volumes, to be published). (5) Angenheister: Geophysik, 2 volumes, in: Handbuch der Experimentalphysik.

A number of special articles on geophysical prospecting appear in German periodicals and trade journals, as for in-

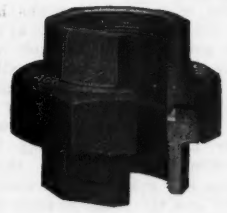
CROSS UNITS AT MAGNOLIA REFINERY



Additional Cross cracking units under construction at the Beaumont, Tex., plant of the Magnolia Petroleum Co.

FLAGG

Ground Joint Unions and Flange Unions



FLAGG "300" UNION

Fig. 338. Improved design with long threads. Each union air tested under water. Steam working pressure 300 lbs. *Conforms to Federal Specification No. 580. Listed as Standard by Underwriters Laboratories.*

FLAGG "300"
IRON SEAT UNION

Fig. 339. This union is recommended for use in steam, oil, gas or air lines and lines carrying acids or crude oil with high percentage of sulphur which is injurious to brass seat. No gaskets being necessary, they save time and trouble.

Steam Working Pressure—300 pounds.

FLAGG UNION

Fig. 337. Each union individually air tested under water. Steam working pressure up to 250 pounds. *Conforms to Federal Specification No. 393. Listed as Standard by Underwriters Laboratories.*

"RED RING"

FLAGG "500"
Malleable Iron Flange Union
Ground Joint—Brass to Iron Seat

LINE PIPE THREAD

Fig. 340. Working pressure for cold oil, water or gas, 800 pounds. Steam working pressure, 500 pounds. Can be furnished with iron seat.

FLAGG "1000"
Malleable Iron Flange Union
Ground Joint—Brass to Iron Seat

LINE PIPE THREAD

Fig. 341. Working pressure for cold oil, water or gas, 1500 pounds. Steam working pressure, 1000 pounds. Can be furnished with iron seat.

FLANGE UNIONS

Ground Joint—Brass to Iron Seat

FLAGG
National Type Flange Union
Cast Iron

LINE PIPE THREAD

BRASS TO IRON SEAT

Tested 800 pounds hydrostatic pressure.

All "RED RING" flange unions are carefully tested and inspected, and being made of *Furnace-Refined* malleable iron, are always dependable.

The opening through the seats is larger than the outside diameter of the pipe hence protruding pipe cannot injure the seat.

"RED RING" Flange Unions are heavier and in most sizes have more bolts than other flange unions of similar type.

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Cast Iron Flange Unions

LINE PIPE THREAD

BRASS TO IRON SEAT

Southwestern Representatives: ALLEN, SPROULL & ALLEN, Burk Burnett Bldg., Fort Worth, Tex.

STANLEY G. FLAGG & CO., INC., PHILADELPHIA, PA.

stance: Petroleum, Zeitschrift fuer praktische Geologie, Kali, Metall und Erz, Zeitschrift fuer Instrumentenkunde, Zeitschrift fuer technische Physik, Zeitschrift der Deutschen Geologischen Gesellschaft, etc.

Activities of Consulting Companies

The number of geophysical consulting companies in Germany is comparatively small. There are only two major companies. The "Seismos," which has been combined with the "Exploration" some time ago, and the "Elbof" (Piepmeyer). The "Prospection" (Doctor Ambronn) operates at present on a much smaller scale than the two companies first mentioned. There exist two or three more prospecting companies, but they have not attained much significance.

The "Seismos" company is doing seismograph work in various countries of the world, primarily in the United States. Professor Mintrop is at present devoting much attention to pendulum observations, He and his associates have endeavored to increase the accuracy of the measurements, chiefly by using the wireless transmission of the oscillations of the reference pendulum to the field stations. The Exploration-Seismos are reported to apply pendulums now in this country to the location of salt domes and buried ridges. Professor Mintrop had obtained, shortly after the end of the war, a patent in Germany on the seismic prospecting method. This patent was revoked about two years ago upon the complaint of Professor Mainka who submitted a report to the patent office containing references of literature previously published on the principles of the seismic method. Professor Mintrop has now appealed to the higher courts; the matter is still pending. The reports of experts in seismology will be submitted to the courts by both parties; one is being prepared by Professor Gutenberg.

The "Exploration" company, before its fusion with the "Seismos," was doing torsion balance, magnetic and electrical prospecting. At the present time, the company is chiefly engaged in torsion balance surveys and is doing but little electric and magnetic work.

The "Elbof" company used originally only the electrical method, but added in the past years, one after another, the magnetic, the torsion balance, the seismic, and most recently the pendulum method. Also radioactive, geothermic, gas-analytic and hydrologic investigations are made when opportunity offers. The company is employing about 60 men, 50 of these being physicists, mining engineers and geologists. The company is working in all parts of the world. Electrical investigations were recently made in eastern Rumania on copper ores, and the indications were proved by mining operations. Magnetic and electric prospecting combined was done on magnetic ores in northern Sweden; the results were confirmed by diamond drilling. Two seismic troops investigated faults in the Rhine Province. In a soft coal area in Hessen, faults were located with the torsion balance and the results checked by drilling. Electrical prospecting has been done in Cornwall, England, on lead zinc; the structural conditions being very complicated, a new inductive method was applied with the result that several deposits being one above the other could be distinguished. In the vicinity of Otavi, Africa, the company makes electrical investigations and works also with torsion balance and seismographs on possible oil structures in East Africa. Another group makes structural investigations with torsion balances, magnetometers and seismographs in New Zealand which are followed by electrical investigations to determine the possibility of the occurrence of oil. Similar measurements were made in the Roma oil field, Queensland, Australia. The company also expects to send a group again to Java, where electrical prospecting for ore had been done previously. In the Po-Plains in Italy electrical investigations were made to determine the possibility of the existence of oil, where the "Exploration" and "Prospection" were working simultaneously with gravitational and seismic methods. No indications of oil were obtained; despite this result, a well, the discontinuation of which had been recommended by the "Elbof," was drilled deeper and deeper, but no oil was found. In the oil field of Moreni in Rumania, an anticline was located and the boundary of oil against salt water was determined. For the government of the State of Mecklenburg, Germany, the salt dome of Luebtheen was investigated by means of gravitational, seismic and electric methods and a remarkable agreement of all methods obtained. In Poland near Schodnica (at Boryslaw) electrical prospecting for oil-bearing structures and the oil itself was made. Director Gella showed me these results and I was surprised how well the different anticlines showed in the electrical map. A chart of the current lines only is, naturally, not always appropriate to show such relations of structure (and oil accumulation respectively) to the electrical data. The Elbof measures, in addition to the horizontal azimuth of the magnetic field of the earth currents, its inclination in the vertical plane, its intensity, angular width of the sound minimum, etc.; graphical representations of these data illustrate the relation between geology and electrical field much better than the mere current line graphs. Usually, however, the companies for which the investigations are made allow (provided they allow publication at all) the Elbof to publish the current line pictures only which often show very little and it is not surprising that they have recently been the object of criticism in the geophysical literature by those who did not see the other charts. Doctor Friedl, who is known through his publication on the Swedish electrical methods in the Vienna Basin, has co-operated with the Elbof in the interpretation of the results. Director Gella stated that not only these investigations in Poland, but similar subsequent measurements in Czecho-Slovakia showed that the structural conditions as well as the presence of oil may be determined from a quantitative electrical chart. At present, a seismic troop of the Elbof is working in Poland. The salt dome of Nienhagen-Wathlingen is being tested by means of the torsion balance. Electrical measurements to find a subterranean water channel of several kilometers in length are made near Fiume.

Working in Louisiana

At the present time, the "Elbof" does not do extensive work in the United States. A torsion balance troop is working in Louisiana, and the results are occasionally checked with electrical methods. I discussed with Director Gella in detail the conflicting statements[1] that are found in the geophysical literature on the results of the electrical prospecting for oil on the Gulf Coast. He stated that at Kingsville actually mistakes had occurred in the interpretation of the results, as not all parts of the field were accessible, the desired arrangement of the primary electrodes could not be made, and primarily because possibly too extreme caution was excercised because of artificial disturbances by pipe lines. Such conditions caused the Elbof to assume no oil at the location of the well Flato 2, which was first productive, but dry at the time of the survey. Later this well produced again at intervals and this was attributed to a failure of the "Elbof" method in later publications. Based on the electrical survey, the wells Gulf Dennet 1 and Kleberg 4 were drilled and productive. These successes were also published in the local journals and attributed to geophsyics, however, the name of the "Elbof" company was not mentioned. Production of wells in other parts of these fields were mostly in harmony with the electrical survey, while some were not, due to the difficulties in the interpretation of the deflections stated above; it will however, not be possible for me to go into more details in this connection. Director Gella was hopeful that he would be able to prove on an oilfield in the United State in the near future what he claims he can do. He will come to this country in the fall of this year. He stated that not only the original Elbof method, but other methods used in conjunction with it permit him to separate good and poor conductors, in other words, to distinguish distortions produced by oil from those due to salt water. The location of such oil deposits will be possible which give off enough gas to reduce the conductivity of a section of strata sufficiently great as compared with depth.

Doctor Ambronn's Work

After the operations of the Erda geophysical company were discontinued, Doctor Ambronn acted for some time as consulting geophysicist and then organized, about three years ago, the Prospection company, together with Professor Salfeld of the University of Goettingen. The Prospection company is applying all geophysical methods, but has thus far been doing chiefly seismograph and electrical work and very little torsion balance and magnetic surveying. In his seismic work, Doctor Ambronn uses about six accelerometers of high magnifications based on the contact principle first applied by Grunmach. The instruments are connected by wires to a common recording apparatus (for details see Colorado School of Mines quarterly 1929, page 90) which is rather cumbersome for shooting at great distance, but has the advantage of having the whole travel time curve on one film. Doctor Ambronn claims that by the huge magnification of his seismographs he can use very little dynamite, but a number of other geophysicists do not agree with him in that respect as a small charge is likely t oproduce only impulses of surficial waves, and little energy will penetrate into the ground so that waves from deeper layers may possibly be missed. Consulting companies in this country starting out with highly sensitive seismographs and too small charges are said to have had the same experience. Furthermore it is reported that Ambronn while working in the Po-Plains in Italy was not able to get the sought deeper strata by the small charges ordinarily used by him and had to keep increasing the charges. At any rate, a definite judgment about this question will be possible only if Doctor Ambronn's method is applied in the same area as some other seismic method. In doing electrical prospecting, Doctor Ambronn uses his own electrical method measuring all parameters necessary to define an alternating magnetic field, that is, intensity, horizontal azimuth, inclination and phase shift. Beside the seismic investigation for the Italian government just mentioned the Prospection has worked with seismographs for the Standard Oil in Rumania, the Peruvian and Jugo-Slavian governments and has carried out electrical surveys for French companies in Eastern Europe and Africa. Recently electrical work was contracted for the March Gold and Porcupine United properties in Porcupine, Canada. This is the first contract the Prospection has undertaken in North America. The "Rouyn Miner" has recently published a letter written by the Prospection to March Gold directors in which the company states that for their methods there is no limit placed by depth and that they can locate veins down to 10,000 feet. This is a rather extraordinary statement taking into account what depths have thus far been reached by electrical methods prospecting for ore, and the actual field results will decide if the company can actually do what it claims. At the present time, the company seems to operate but on a very small scale, according to a statement reported to have been made by Doctor Ahlfeld at the International geologist's congress in South Africa. This year while in Goettingen, I did not see the laboratory of the company. I believe that the Sartorius Precision Balance company makes the instruments for them. The Prospection company sells Doctor Ambronn's electrometer for radioactive measurements. Recent investigations made with this instrument by the University of Goettingen under the direction of Professor Stille indicate that faults in sedimentary areas may be well located with it.

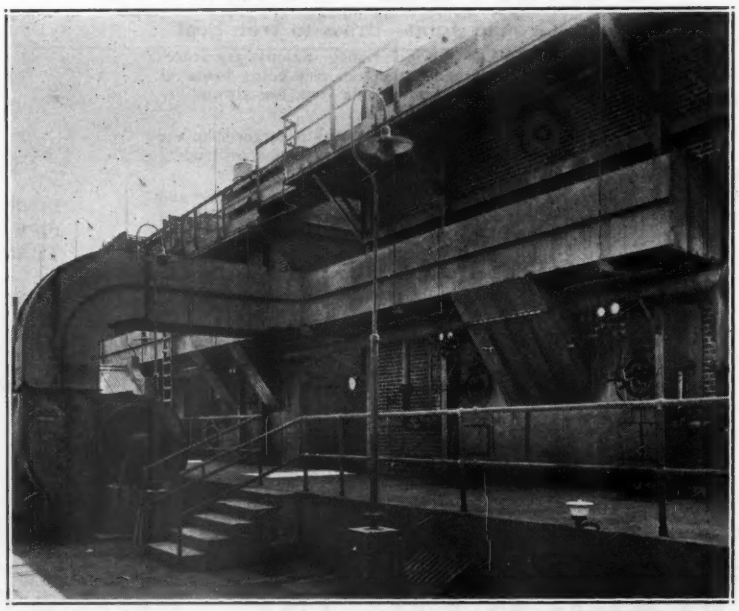
Manufacturers of Instruments

As to the manufacturers of geophysical instruments in Germany, there is first the Askania-Werke company in Berlin, being by far the largest. The Askania-Werke manufactures pendulum apparatus, torsion balances, magnetometers, magnetic recording instruments, mechanical seismographs, geophones and electrodynamical seismographs. The manufacture of geophysical instruments does not constitute the only line of activity of this company, but they make also nautical, optical, astronomical, thermodynamic instruments, moving picture cameras, etc. The manufacturing plants are in Friedenau and Mariendorf (Berlin).

(Continued on Page 274)

[1] "Geophysical Methods of Prospecting," Colorado School of Mines Quarterly, March, 1929, p. 115.

NEW PIPE STILLS FOR RICHFIELD PLANT



Recently complete battery of 15,000-bbl. pipe stills at the Hynes, Calif., plant of the Richfield Oil Co. Note system of forced draft and combination oil and gas burners.

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Specifies — Greater Application Speed

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THE longer life of "P & H Process" Cedar Poles assures a minimum of replacements and consequently lower maintenance costs. They are guaranteed, *in writing*, to show a full sapwood penetration of the preservative to a depth of one-half inch throughout the groundline area. Investigate, find out for yourself why others prefer "P & H Process" Poles.

Fast Shipping Service. We can supply all your pole requirements *promptly*, from our complete stocks of Butt-Treated Cedar Poles.

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Omaha, Neb., 711 Electric Bldg. Dayton, Ohio, 854 Reibold Bldg. Boston, Mass., 733 Public Service Bldg.

WILDCAT OPERATIONS IN TEXAS PANHANDLE

(Continued from Page 92)

Skelly Oil Co.'s No. 21 Schafer, 340 ft. N, 1,540 ft. W, SE cor. SE, Sec. 68, Blk. 4, I.&G.N.R.R. Sur. ..... Location.

Stubblefield et als' No. 1 Garner, 330 ft. from S and E lines, SE, Sec. 104, Blk. 4 ..... Drlg. 2,955 ft.

The Texas Co.'s No. 4 Lewis, 330 ft. N and E, SW cor. NW NE, Sec. 115, Blk. 4, I.&G.N.R.R. Sur. ..... Drlg. 275 ft.

The Texas Corp.'s No. 2 Noel, 990 ft. from S, 330 ft. W, NW, Sec. 187, Blk. B-3, I.&G.N. Sur. ..... Drlg 880 ft.

CASTRO COUNTY

Colorado O. & R. Co.'s No. 1 M. Slemmons, SW cor., Sec. 73, Blk. M-17, B.S.&F. Sur. ..... Rig blown down.

Mystery Oil Co.'s No. 1 J. I. Crum, SE cor. NE, Sec. 333, Blk. M-6, S.K.&K. Sur. ..... S.D. 510 ft. for csg.

CHILDRESS COUNTY

C. L. Sloane et als' No. 1 B. P. Smith, Sur. 49, F. P. Knott lands ..... Drlg. 1,675 ft.

COCHRAN COUNTY

Continental Oil Co.'s No. 1 Slaughter-A, 330 ft. from W, 430 ft. from S lines, League 130, Carson County School land ..... Small show gas 4,745-50 ft; 3,000 ft. oil in hole 4,883 ft; T.D. 5,001 ft; P.B. 4,900 ft; C.O. to shoot; oil pay 4,873-88 ft; testing; plug did not hold.

Westbrook et als' No. 1 Slaughter, 400 ft. from S and E, Labour 67, League 118, Knox Co. School Lands .. Spudding.

COTTLE COUNTY

Expltn. Co.'s No. 3 Matador Land & Cattle Co., C, Sec. 46, J. H. Stephens Sur. ..... S.D. 4,000 ft.

DONLEY COUNTY

Blue Bonnett Oil Co.'s No. 1 Ball, 1,075 ft. from N line, 985 ft. from E line, Sec. 22, Blk. E, D.&P.R.R. Sur.. T.D. 3,006 ft; contract depth.

Marine Oil Co.'s No. 1 Sawyer, C SW, Sec. 5, Blk. G, G.C.&S.F. Sur. ..... S.D. 3,510 ft.

Southland Oil Co.'s No. 1 Lewis, C SE 40 ac., Sec. 3, Blk. 29, H.&G.N.R.R. Sur. ..... Drlg. 2,150 ft.

GRAY COUNTY

Alexander and Shell Pet. Corp.'s No. 1 Harrah-McKinney, 330 ft. S and W, NE cor. E½ SE, Sec. 163, Blk. 3, I.&G.N.R.R. Sur. ..... T.D. 680 ft.

British-American Oil Co.'s No. 2 Purviance, 330 ft. N and E, SW cor. E 160 ac., Sec. 61, Blk. B-2, H.&G. N.R.R. Sur. ..... Location.

Champlin Ref. and Danciger's No. 2 Cook-Faulkner, 360 ft. N, 330 ft. E, SW cor. W 120 ac. of E 200 ac., Sec. 30, Blk. B-2, H.&G.N.R.R. Sur. ..... 1,500 ft. oil in hole 2,855-57 ft; T.P. 2,857-65 ft; Drlg. 2,960 ft.; flowing 150 bbls.

Champlin Ref. and Danciger's No. 3 Cook-Faulkner, 330 ft. S and E, NW cor. W 120 ac. of E 200 ac., Sec. 30, Blk. B-2, H.&G.N.R.R. Sur. ..... Location.

Champlin Ref. Co.'s No. 2 Jackson, 330 ft. each way from SE cor., W 100 ac., Sec. 60, Blk. B-2, H.&G.N.. Sprayed 5 bbls; T.P. 3,920 ft; drlg. 4,015 ft.

Champlin Ref. Co.'s No. 3 McLaughlin, 990 ft. from S and E lines, E½, Sec. 33, Blk. B-2 ..... S.D. 2,855 ft.

Crabtree Drlg. Co.'s No. 1 B. F. Talley, SW NE, Sec. 114, Blk. M-2, B.S.&F. Sur. ..... S.D. 2,740 ft.

Danciger O. & R. Co.'s No. 1 Arnold, 330 ft. N and E, SW cor. SE, Sec. 149, Blk. 3, I.&G.N. Sur. ..... Drlg. 2,925 ft.

Danciger O. & R. Co.'s No. 4 Beck, 330 ft. S and W, NE cor., Sec. 28, Blk. B-2, H.&G.N. Sur. ..... Set 8¼-in. csg; T.D. 2,76' ft

Danciger O. & R. Co.'s No. 6 Beck, 330 ft. S, 990 ft. W, NE cor., Sec. 28, Blk. B-2, H.&G.N. Sur. ..... T.D. 2,450 ft.

Danciger O. & R. Co.'s No. 7 Beck, 330 ft. S, 1,650 ft. W, NE cor., Sec. 28, Blk. B-2, H.&G.N. Sur. ..... S.D. 2,680 ft.; S.G. 2,397-2,455 ft.

Danciger et als' No. 11 Jackson, 330 ft. S, 1,320 ft. W, NE cor. NW, Sec. 88, Blk. B-2, H.&G.N. Sur. ..... T.D. 2,906 ft; set 8¼-in. csg

Danciger O. & R. Co.'s No. 1 McLarty, 1,220 ft. from S, 330 ft. from W, W½ NW, Sec. 10, Blk. 1, A.C.H. &B. Sur. ..... S.D. 2,065 ft.

Danciger O. & R. Co.'s No. 1 Shaw, 330 ft. from S, 356 ft. from E of E 39½ ac. NW, Sec. 5, Blk. 1, A.C. H.&B. Sur. ..... T.D. 2,619 ft; coring.

Danciger O. & R. Co.'s No. 1 Williams, 330 ft. from N, 330 ft. from E, S½ NW ..... Estimated 15,000,000 ft. gas 2,610-70 ft; S.D. 2,720 ft.

Dunlop's No. 4 Morse, 330 ft. N and E SW cor. SW, Sec. 17, Blk. A-9, H.&G.N.R.R. Sur. ..... Rig.

Sines & Reiger's (formerly Eslick et als') No. 1 Mrs. J. A. Hopkins, NW cor. W 80 ac. of SW, Sec. 84, Blk. B-2, H.&T.C. Sur. ..... S.D. 3,206 ft.

Gardner Bros. and Collins' No. 2 Saunders, 955 ft. from S, 330 ft. from E of W 68 ac. E½, J. G. Eustice Sur.. Location.

Gulf Prod. Co.'s No. 2 Worley-A, 330 ft. N, 990 ft. W, SE SW, Sec. 36, Blk. 3, I.&G.N. Sur. ..... Drlg. 2,952 ft.; 500 ft. oil in hole.

Gulf Prod. Co.'s No. 3 Worley-A, 330 ft. N, 1,650 ft. W, SE SW, Sec. 36, Blk. 3, I.&G.N.R.R. Sur. ..... S.D. 2,903 ft.

Guernsey Oil Co.'s No. 1 Pope, 330 ft. from N and W lines, W½ SW, Sec. 173, Blk. 3, I.&G.N. Sur. ..... Drlg. 2,350 ft.

Haymer O. & G. Co.'s No. 1 Morse, 330 ft. each way out of SE cor. E½ SE, Sec. 45, Blk. A-9, H.&G.N. Sur. ..... Rigging up.

Herragan Oil Co.'s No. 1 Bradford, 330 ft. from N, 990 ft. from E, Sec. 123, Blk. B-2 ..... T.D. 2,670 ft.; U.R. 8¼-in. csg.; first show gas 2,475-80 ft; 15,000,000 f.. gas 2,515-40 ft.

Hinerman Bros. No. 1-A Taylor, 330 ft. from NE of E½ of NE¼ Sur. 8, Blk. H.A.H. Wallace Sur..... Fishing 350 ft.

Humble O. & R. Co.'s No. 1 Chapman, 330 ft. from N and E, NW, Sec. 69, Blk. 25, H.&G.N. Sur. ..... Spudding.

Humble O. & R. Co.'s No. 3 Jackson, 330 ft. from E line, 330 ft. from N line of E 110.5 ac., Sec. 90, Blk. B-2, H.&G.N.R.R. Sur. ..... S.G. 2,533 ft.; T.D. 2,898 ft. S.G. 2,782 ft.

Humble O. & R. Co.'s No. 4 Jackson, 976 ft. N, 330 ft. E, SW cor. E 95.25 ac., Sec. 90, Blk. B-2, H.&G.N. Sur. S.G. 2,271 ft.; drlg. 2,710 ft.

Humble O. & R. Co.'s No. 1 Palmer, 330 ft. from N and E lines of W 100 ac., Sec. 31, Blk. B-2, H.& G.N. Sur. ..... S.D. 2,797 ft; S. G. 2,697 ft.

Independent O. & G. Co.'s No. 1 Hollenbeck, 990 ft. each way from NE cor. NE, Sec. 176, Blk. 3, I.&G. N.R.R. Sur. ..... 5,000,000 ft. gas from 2,428-33 ft; T.D. 3,470 ft; P.B. for gas.

Magnolia Pet. Co.'s No. 7 Bowers, 990 ft. S and E, NW cor. NW, Sec. 63, Blk. B-2, H.&G.N.R.R. Sur. .. Drlg. 1,715 ft.

Magnolia Pet. Co.'s No. 8 Bowers, 990 ft. N and E, SW NW, Sec. 63, Blk. B-2, H.&G.N.R.R. Sur. ..... Drlg. 700 ft.

Magnolia Pet. Co.'s No. 1 Wright, 330 ft. S and W lines, S½ SW, Sec. 13, Blk. 3, I.&G.N. Sur. ..... Drlg. 2,710 ft.; 15,000,000 ft. gas from 2,707-10 ft.

Magnolia Pet. Co.'s No. 2 Wright, 320 ft. from W, 330 ft. from S of S½ SW, Sec. 13, Blk. 3, I.&G.N. Sur. .. Drlg. 2,675 ft.

McMan O. & G. Co.'s No. 3 Jackson, 974 ft. N, 330 ft. W, SE cor. W 95.25 ac. of E 190.5 ac., Sec. 90, Blk. B-2, H.&G.N. Sur. ..... S.D. 2,024 ft; cmtd. 10-in. csg.

McMan O. & G. Co.'s No. 4 Jackson, 970 ft. N, 330 ft. E, SW cor. W 95.25 ac. of E 190.5 ac., Sec. 90, Blk. B-2, H.&G.N. Sur. ..... Drlg. 1,920 ft.

McMan O. & G. Co.'s No. 6 Palmer, 330 ft. S and E of NW E 100 ac. of W 200 ac., Sec. 31, Blk. B-2, H.&G.N. Sur. ..... T.D. 2,762 ft.

Oil Operators' No. 1 Bowers, 330 ft. from N, 330 ft. E, Sec. 93, Blk. B-2, H.&G.N. Sur. ..... Show oil and gas 2,400-17 ft; drlg. 2,794 ft; first gas 2,433 ft; increased at 2,500 ft., 2,544 ft. and 2,950 ft; first gas 2,385-95 ft; 15,000,000 ft. gas 2,450-2,627 ft; S.D. 2,865 ft; C.O.

Operators Oil Co.'s No. 1 Lovett, 330 ft. from N and W line, W½ NE, Sec. 57, Blk. B-2, H.&G.N. Sur. ..... G. 2,390 ft; standardizing 2,793 ft.

Operators Oil Co.'s No. 5 Cook-Faulkner, 990 ft. N, 330 ft. W, SE of W 90 ac., Sec. 30, Blk. B-2, H.&G.N. Sur.. S.D. 2,748 ft; standardizing.

Operators Oil Co.'s No. 6 Cook-Faulkner, 330 ft. S and E, NW cor., Sec. 30, Blk. B-2, H.&G.N.R.R. Sur. ... S.G. 2,424 ft; and 2,477 ft; S.D. 2,750 ft.

Operators Oil Co.'s No. 7 Cook-Faulkner, 330 ft. S, 320 ft. E, NW cor., Sec. 30, Blk. B-2, H.&G.N. Sur. ..... S.G. 2,380 ft; S.D. 2,691 ft.

Operators Oil Co.'s No. 8 Cook-Faulkner, 330 ft. S, 1,310 ft. E, NW cor., Sec. 30, Blk. B-2, H.&G.N.R.R. Sur.. S.D. 2,685 ft.

Osborn et als' No. 1 Morse, 330 ft. N and E, SW cor. S½ NE, Sec. 1, Blk. 26, H.&G.N.R.R. Sur ..... S.O. 2,572 ft; C.O. and swbng. 500 ft. oil from 2,572-2,670 ft.; S.D. 2,672 ft.; to deepen.

Panhandle Ref. Co.'s No. 3 Saunders, 330 ft. N and E, SW cor. E½ NE, Sec. 3, Blk. 1, A.C.H.&B. Sur. .... S.D. 2,385 ft.; U.R. 6⅝-in csg.

Phillips Pet. Co.'s No. 1 Eakin, 330 ft. from S. 330 ft. from W, Sec. 56, Blk. 25, H.&G.N.R.R. Sur. ..... S.O. 2,245-55 ft; 1,000,000 ft. gas 2,170-2,255 ft.; drlg. 4,235 ft.

Phillips Pet. Co.'s No. 1 Jackson, 330 ft. each way from NE cor. NE, Sec. 53, Blk. B-2, H.&G.N.R.R. Sur. .... S.O. 2,712-22 ft; 250 ft. oil in hole; set 5-in. csg. 3,018 ft; 7,000,000 ft. gas 3,130 ft; 1,000,000 ft. gas 3,144 ft; T.D. 3,260 ft; P.B. 3,060 ft; fishing.

Phillips Pet. Co.'s No. 6 Jackson, 330 ft. from N, 990 ft. from E line, S½ NE, Sec. 88, Blk. B-2, H.&G.N. R.R. Sur. ..... T.D. 2,775 ft.

Phillips Pet. Co.'s No. 6 Palmer, 330 ft. S and W, NE cor., Sec. 31, Blk. 2, H.&G.N.R.R. Sur. ..... S.D. 2,743 ft.

Plains Drlg. Co.'s No. 1-A Chapman, 330 ft. from S and W, NE, Sec. 10, Blk. 26, H.&G.N. Sur. ..... Drlg. 2,320 ft.

Prairie O. & G. Co.'s No. 1 Langham, 330 ft. N and E, SW, Sec. 1, Blk. B-2, H.&G.N.R.R. Sur. ..... 60,000,000 ft. gas; drlg 2,313 ft.

Quillian et als' No. 1 Barrett, 330 ft. from N, 330 ft. from E, Sec. 131, Blk. 3, H.&G.N. Sur. ..... Drlg. 2,500 ft.

Ray & Massie's No. 5 Chapman, 330 ft. S and W, NE SE SW, Sec. 51, Blk. 25, H.&G.N.R.R. Sur. ..... Drlg. 2,825 ft.; S.O. 2,320 ft.

Ray et al No. 1 Noble, 240 ft. from S. and 330 ft. from W. line of W. 80 ac. of SW¼ Sur. 10, Blk. A-6, H.&G.N. ..... Rig.

Shamrock O. & G. Co.'s No. 2 Saunders-Lincoln, 330 ft. N and W, SE cor. W½ NE, Sec. 3, Blk. 1, A.C. H.&B.R.R. Sur. ..... T.D. 2,146 ft.; set 8¼-in. csg.

Shamrock O. & G. Co.'s No. 3 Saunders, 330 ft. N and E, SW E½ SE, Sec. 4, Blk. 1, A.C.H.&B. Sur. ..... Drlg. 885 ft.

Shamrock O. & G. Co.'s No. 1 Taylor, 330 ft. each way out of NE cor. NW, Sec. 1, Blk. 2, H.&G.N. Sur. ... Rig.

Skelly Oil Co.'s No. 1 Chapman, 330 ft. from S and E, S½ NW, Sec. 69, Blk. 25, H.&G.N. Sur. ..... Spudding.

Skelly Oil Co.'s No. 5 Jackson, 970 ft. N, 330 ft. W of SE cor. W. 190 ac. of Sec. 90, Blk. B-2, H.&G.N. Sur. ..... Drlg. 1,693 ft.

St. Clair Oil Co.'s No. 1 Dial, 330 ft. S and W, NE cor. SE, Sec. 10, Blk. 25, H.&G.N.R.R. Sur. ..... Cellar.

St. Clair Oil Co.'s No. 1 Rowe, Sec. 32, Blk. R ..... S.D. 3,490 ft; hole full wtr

St. Clair Oil Co.'s No. 1 L. S. Stockton, SE cor., Sec. 35, W. R. Lee Sur. ..... Spudded and S.D.

Stogner Meaders No. 1 Taylor, 330 from S. and E. of SW¼, Sur. 7, Blk. H, A. H. Wallace ..... Drlg. 650 ft.

Sun Oil Co.'s No. 4 Purviance, 330 ft. S and E, NW cor., Sec. 61, Blk. B-2, H.&G.N.R.R. Sur. ..... S.D. 2,410 ft.; standardizing.

The Texas Corp.'s No. 3 Bruce Bull, 330 ft. from N, 330 ft. from W, Sec. 2, Blk. B-2 ..... 8,000,000 ft. gas 2,340-50 ft; S.D 2,675 ft.

The Texas Co.'s No. 3-B Chapman, 330 ft. S and E, NW cor. SE, Sec. 69, Blk. 25, H.&G.N.R.R. Sur. ..... Drlg. 315 ft.

The Texas Co.'s No. 3 Comb-Worley, 330 ft. N and W SE cor., Sec. 36, Blk. 3, I.&G.N. Sur. ..... S.D. 2,710 ft.

The Texas Co.'s No. 7 Cook-Faulkner, 330 ft. N and W, SE cor. W 200 ac., Sec. 29, Blk. B-2, H.&G.N Sur. . Drlg. 2,555 ft.

The Texas Co.'s No. 3 McLarty-B, 1,326 ft. S, 660 ft. E, NW E½, Sec. 10, Blk. 1, A.C.H.&B. Sur. ..... Drlg. 1,626 ft.

The Texas Co.'s No. 14 Saunders, 955 ft. N, 330 ft. W, SE cor. W½ of J. G. Eustis Sur. ..... Drlg. 1,175 ft.

The Texas Co.'s No. 15 Saunders, 330 ft. N and W, SE cor. W½ SE, Sec. 4, Blk. 1, A.C.H.&B. Sur. ..... Spudding.

White Eagle O. & R. Co.'s No. 1 Faulkner, 330 ft each way from SE cor., E 60 ac., Sec. 29, Blk. B-2, H. &G.N. Sur. ..... S.D. 2,735 ft; 30,000,000 ft. gas 2,717-35 ft.

White Eagle O. & R. Co. et als' No. 2 Faulkner, 330 ft. from S and W, E 60 ac., Sec. 29, Blk. B-2 ..... Standardizing 2,476 ft.

Wright Wilson, trustee's No. 1 Chapman, 175 ft. from S and E line, N½ NW, Sec. 69, Blk. 25, H.&G.N. Sur Drlg. 1,430 ft.

HOCKLEY COUNTY

World Oil Co.'s No. 1 Ellwood, 320 ft. from N and W lines, League 7, Wilbarger County School lands; elevation 3,363 ft; contract depth 5,000 ft. ..... S.D. 3,250 ft.

HUTCHINSON COUNTY

Alamosa Oil Co.'s No. 4 Sanford, 310 ft. S, 320 ft. W, NE cor. of N 160 ac. of S 240 ac., Sec. 85, Blk. 46, H.&T.C. Sur. ..... Drlg. 2,922 ft.

Continental Oil Co.'s No. 1-B Johnson, 330 ft. S and W, NE cor. NW, Sec. 6, Blk. 1, B.&B. Sur. ..... 10,000,000 ft. gas; drlg 2,710 ft.

Devore Oil Co.'s No. 1 Johnson Bros., 330 ft. from S and E line, NW SW, Sec. 28, Blk. Y, A.&B. Sur. ..... Drlg. 2,730 ft.

Holmes et als' No. 1 Moore-A, 330 ft. N and E, SW cor. S½ NE, Sec. 125, Blk. 4, I.&G.N. Sur. ..... T.D. 3,050 ft.; T.P. 3,000-40 ft.; flowing and swabbing 10 bbls. per hour.

Huey et als' No. 3 Smith et al, 330 ft. from N, 660 ft. from W, S 40 ac. of E 100 ac., SE, Sec. 12, Blk. Y Set 8-in. csg. 1,933 ft.

Midwest Explin. Co.'s No. 1 Garner et al, 330 ft. N and W, SE cor. NE, Sec. 124, Blk. 4, I.&G.N. Sur. ..... S.D. 2,150 ft.

Midwest Explin. Co.'s No. 2 Garner et al, 330 ft. N, 1,650 ft. W, SE cor. NE, Sec. 124, Blk. 4, I.&G.N. Sur.. Drlg. 595 ft.

O. B. Penney's No. 2 Johnson Bros., 330 ft. from S line, 330 ft. from W line, W½ NE, Sec. 35, Blk. Y, A. &B. Sur. ..... 31,000,000 ft. gas 1,930 ft. drlg 2,965 ft.

Phillips Pet. Co.'s No. 1 Johnson Bros., 330 ft. from N and W lines, NW, Sec. 34, Blk. Y, A.&B. Sur. ..... Pay 2,951-72 ft; initial prod. 30 bbls. oil and 5,000,000 ft gas fishing 3,035 ft.

Phillips Pet. Co.'s No. 6 (Florence), 330 ft. each way from S and W lines, E½ ..... T.D. 2,876 ft; T.P. 2,805 ft, L.P. 70 bbls; shot 54 qts. 2,782-2,820 ft.; C.O. 2,876 ft.

Prairie O. & G. Co.'s No. 4 Cal Merchant, 5,612 ft. S, 330 ft. E, NW, Sec. 37, Blk. 47, H.&T.C.R.R. Sur. ... S.D. 3,050 ft.; 1,000,000 ft. gas.

Prairie O. & G. Co.'s No. 4 Shaw, 330 ft. S, 990 ft. W, NE cor., Sec. 27, Blk. Y ..... T.D. 2,942 ft.; T.P. 2,895-2,902 ft.; to shoot.

Reliance O. & G. Co.'s No. 2 Sanford, 330 ft. S and E, NW W½ of N 80 ac. of S 320 ac., Sec. 83, Blk. 46, H.&T.C. Sur. ..... Drlg. 990 ft.

Skelly Oil Co.'s No. 2 Lee Bivins, 306 ft. from E, 1,242 ft. from S line, S 160 ac. of N 320 ac., Sec. 34, Blk. 46, H.&T.C.R.R. Sur. ..... Drlg. 2,180 ft.

Sunny Jim Oil Co.'s No. 3 Pitts, 330 ft. N and W, of most southerly SE cor., Sec. 9, Blk. M-21, T.C. Sur. ..Location.
Travelers Oil Co.'s No. 2 Cockrell, 350 ft. from E and S line, Sec. 8, Blk. B-3, D.&S.E. Sur. .....1,000,000 ft. gas 2,610-2,770 ft drlg. 2,900 ft.

KING COUNTY

Huff Oil Co.'s No. 1 Martin, 1,320 ft. from N line, 1,320 ft. from E line, Sec. 171, Blk. F, H.&T.C. Sur. .....Rig.

LAMB COUNTY

Graham O. & G. Co. et als' No. 1 Ellwood, CWL, Sec. 9, Blk. T, T. A. Thompson Sur. .....S.D. 3,240 ft.

LIPSCOMB COUNTY

Brown et als' No. 1 Box T Ranch, SW NE, Sec. 612, H.&T.C Sur. .....S.D. 3,305 ft.
Okla. Public Service Co.'s No. 1 C. W. Jones, NE SW, Sec. 100, H.&T.C. Sur. .....T.D. 4,775 ft; U.R. 5 3/16-in. csg

LUBBOCK COUNTY

Center Oil Co.'s No. 1 Bowles Ranch .....Small S.O. 1,133-40 ft; sand; S.D 4,167 ft.

MOORE COUNTY

Amarillo Oil Co.'s No. 1 Read-A, C NW, Sec. 14, Blk. 13-12, D.&P. Sur. .....4,000,000 ft. gas; drlg 2,700 ft.
Amarillo Oil Co.'s No. 1 Perkins-A, 330 ft. each way out of NW cor. NE, Sec. 76, Blk. 3 .....Drlg. 2,535 ft.
Red River Gas Co.'s No. 1 J. M. Shelton, 330 ft. each way from SE cor., Sec. 52, Blk. 3, G.&M. Sur. .....Spudding.
Dana O. & G. Co.'s No. 1 Anthony, C NW, Sec. 260, Blk. 44, H.&T.C.R.R. Sur. .....C.O. 2,333 ft.
Fritch O. & G. Co.'s No. 1 Lee Bivins, C NE 40 ac. of N 160 ac., Sec. 4, Geo. Mahan Sur. .....2,000,000 ft. gas 1,550-65 ft.; drlg. 2,225 ft.

MOTLEY COUNTY

Expltn. Co.'s No. 5 Matador, C, Sec. 45, Blk. J-B, C. B.&C.N.G.R.R. Sur. .....S.D. 2,450 ft.
Expltn. Co.'s No. 6 Matador, 330 ft. from N line, 330 ft. from E line, Sec. 132, Blk. M .....Drlg. 2,495 ft.
Matador Oil Corp.'s No. 1 Owen, C NE, Sec. 10, Blk. G, B.&B. Sur. .....S.D. 580 ft.

POTTER COUNTY

Canadian River Gas Co.'s No. 1 Allison "A," 386 ft. from E line, 5,439 ft. from S line, Sec. 1, W. T. Palmer Sur...Rig.

RANDALL COUNTY

W. A. Patterson's No. 1 Palo Duro, Sec. 60, Blk. K-14....S.D. 1,350 ft.

ROBERTS COUNTY

Big Bend Oil Co.'s No. 1 Ledrick, Sec. 7, Blk. 5-A..... T.D. 5,992 ft; will P.B. and shoot S.O. 5,288-91 ft; C.O.

WHEELER COUNTY

A. R. Anderson et als' No. 1 Cuddleback, C SE NW, Sec. 18, Blk. Z-4, H.&G.N. Sur. .....T.D. 1,910 ft.; 1,000,000 ft. gas from 1,895-1,910 ft.
Byrens et als' No. 1 Johnson, SW cor. NE, Sec. 38, Blk. A-5, H.&G.N. Sur. .....S.D. 2,920 ft.
Lela O. & G. Co.'s No. 1 Williams & Laycock, 330 ft. from S, 209 ft. from W, W½ NW, Sec. 20, Blk. A-8, H.&G.N. Sur. .....S.D. 1,400 ft.
Shell Pet. Corp.'s No. 1 Ackley, C SW SE, Sec. 20, Blk. 24, H.&G.N. Sur. .....Rigging up.
The Texas Co.'s No. 1 Cuddeback, C SE SE, Sec. 18, Blk. 24, H.&G.N. Sur. .....Rigging up.
Upham Gas Co.'s No. 4 Close-Gooch, C NW SW, Sec. 81, Blk. 23, H.&G.N.R.R. Sur. .....Drlg. 1,490 ft.
Upham Gas Co.'s No. 1 Shelton, C SE NE, Sec. 22, Blk. 24, H.&G.N.R.R. Sur. .....S.D. 1,775 ft.
Vaughn et als' No. 3 Ackley, 330 ft. from N, 330 ft. from W, Sec. 4, Blk. 27, H.&G.N. Sur. .....T.D. 1,840 ft; 5,000,000 ft. gas 1,660-1,770 ft.
Wischkamper et als' No. 1 Curry, C NE SE, Sec. 53, Blk. 23, H.&G.N. Sur. ..... Drlg. 1,285 ft.

WILDCAT OPERATIONS IN WEST TEXAS

(Continued from Page 89)

CONCHO COUNTY

Duffy et al's No. 1 Callan, 1,530 ft. N and 1,120 ft. W of SE cor., Sec. 21, Blk. 10, H.&T.C.R.R. .....Spudded and shut down.
Jones & Leiner's No. 1 Jones, 420 ft. S and 15 ft. E of NW cor., John G. Reh Sur. No. 1,878 .....Top lime 1,770 ft.; top pay 1,775-80 ft.; 18 ft. oil in hole; to test; shut down 2,375 ft.
Turner et al's No. 1 Borsig, 150 ft. from S of SE cor. G. Emig Sur. 130, 6 mi. W of Paint Rock .....Shut down 735 ft.

CRANE COUNTY

Duffey et al's No. 6 Cowden, 990 ft. from S, 1,650 ft. from E, Sec. 18, Blk. T .....Drlg. 985 ft.
Gulf Prod. Co.'s No. 67 McElroy, 2,102 ft. S and 2,640 ft. W of NE cor., Sec. 201, Blk. F, C.C.S.D. &R.G.N.G.R.R. .....Drlg. 1,980 ft.
Gulf Prod. Co.'s No. 68 McElroy, 771 ft. S of NE cor. on E line of their lease in Sec. 200, Blk. F, C.C. S.D.&R.G.N.G. .....Drlg. 2,705 ft. anhydrite; top salt 1,175 ft.; cem. 8¼-in. casing 1,205 ft.
Gulf Prod. Co.'s No. 8 Waddell, 330 ft. N and W of SE cor., Sec. 2, Blk. B-24, School Land .....Top salt 1,328 ft.; running 6-in. casing 3,049 ft.
Humble O. & R. Co.'s No. 2-D University, 990 ft. from W and 330 ft. from S of NW Sec. 34, Blk. 30 .....Location.
Simms-Atlantic's No. 10-A University, 2,310 ft. S and E, Sec. 39, Blk. 30, University .....Top salt 1,070 ft.; cleaning out 3,040 ft.
Simms-Atlantic's No. 2-F University, Sec. 45, Blk. 30, 2,310 ft. from N, 330 ft. from E, University .....Rig.
Tidal Oil Co.'s No. 2 University-D, 330 ft. S and W of NE cor. NW of SW Sec. 34, Blk. 30, University Land..Location.
Tidal Oil Co.'s No. 10 University, 859 ft. from W and 1,255 ft. from S line of SE, Sec. 47, Blk. 30, University Land .....Drlg. 2,175 ft.
T. P. Coal & Oil Co.'s No. 2 University, 2,310 ft. from S, 1,650 ft. from W, Sec. 34, Blk. 30, University Land..Rigging up.

CROCKETT COUNTY

California Co.'s No. 3 Powell, Lease No. 1, 1,056 ft. N and 495 ft. E of SW cor., Sec. 62, Blk. BB, G.C. &S.F. .....Drlg. 2,100 ft.
Eppenaur et al's No. 2 Noelke, 500 ft. N and 1,250 ft. E of SE cor., Sec. 64, Blk. 1, L&G.N.R.R. Sur. .....Top salt 720 ft.; fishing 1,125 ft.
Lewis & Daniels' No. 1 Pecos River Bed, 19 yards S and 27 degrees E of NW cor., Sec. 33, Blk. 1, I.&G.N. Sur...Shut down 1,355 ft.
W. W. Donnelly & Young's No. 1 Shannon, SW SW SE, Sec. 42, Blk. BB, T.C.R.R. Sur. .....Total depth 2,556 ft.; pumped 168 bbls. oil, 8 bbls. water Sept. 24.
W. W. Donnelly & Young's No. 1 Middlebuster, C Sec. 11, Blk. 9, D.&S.E. Sur. .....7,000,000 ft. gas at 1,663 ft.; shut down 1,755 ft.
Moncrief's No. 3 Todd, 330 ft. from S and E, Sec. 29, Blk. VV .....Shut down 775 ft
Taylor-Link's No. 2 Powell, 1,000 ft. S of No. 2, Sec. 52, Blk. BB, E.L.&R.R. Sur. .....S.D. 2,380 ft.

CULBERSON COUNTY

Deep Rock Oil Co.'s No. 3 Kloh, 360 ft. N and 1,388 ft. W, Sec. 39, Blk. 59 .....Shut down 1,602 ft
Grisham & Hunter Oil Corp.'s No. 1 fee, 330 ft. from S and W of Sec. 14, Blk. 59, T.&P. .....Spudding.
Hickey & Stiver's No. 1 C. O. Finley, 600 ft. N and 1,980 ft. W, Sec. 26, Blk. 82 .....Small show oil 1,331 ft., shut down 2,260 ft.; hole full water; elev. 3,874 ft.; shut down for 30 days.
West Coast Oil & Exploration Co.'s No. 1 McGregor, C NW, Sec. 14, Blk. 81 .....Slight show oil 740 ft.; shut down 825 ft.
Scott & Dittman's No. 1 Miller, 1,160 ft. N and 2,480 ft. E, Sec. 1, Blk. 97, Public School Land .....Rainbow 1,056 ft.; 300 ft. sulphur water 1,725 ft.; oil show 2,528 ft.; hole full sulphur water; running 6-in. casing; drlg. 3,075 ft.

ECTOR COUNTY

Anderson's No. 1 fee, 1,320 ft. E along N line, Sec. 19, and 150 ft. N at right angles with line, Sec. 18, Blk. B-16, Public School Land .....Moving in material
R. R. Penn et al's No. 1 Kloh-Rumsey, 330 ft. N and 2,640 ft. E of SW, Sec. 7, Blk. 44, Twp. 3s, T.&P. R.R. Sur. .....Top salt 1,230 ft.; drlg. 3,360 ft.; 3 bailers water 345-65 ft., red sand.

EL PASO COUNTY

Layter' No. 1 Malone, 2,200 ft. SW and NW Sec. 46, J. M. Day Sur. .....Drlg. 1,185 ft.

EDWARDS COUNTY

A. M. Griffith's No. 1 Wardlow, Sec. 60, V-8, J. C. Clift Sur. .....Shut down 3,000 ft

FISHER COUNTY

Cranfill & Reynolds' No. 1 Barrett, Sec. 191, Blk. 1, 330 ft. from S and W of NE, B.B.B.&C.Ry. .....Drlg. 360 ft.
Cranfill & Reynolds' No. 1 Texas Cement, Sec. 10, 330 ft. from N and W of most westerly NW cor. .....Fishing 1,625 ft.
Magnolia Pet. Co.'s No. 1 Lee, Sec. 357, 2,310 ft. from N and 4,286 ft. from W .....Drlg. 3,205 ft.
Mesa Oil Co.'s No. 1 Griffin, 349 ft. N and 465 ft. E of NE cor. Sec. 20, School Land .....Shut down 3,380 ft.
Midwest Oil Co.'s No. 1 Steele, 660 ft. from S, 440 ft. from W, Sec. 210, Blk. 1 .....Drlg. 2,640 ft.
H. Riley's No. 1 J. H. Veatch, 250 ft. S and 990 ft. E of NW cor., Sec. 4, English Sur. .....Drlg. 2,689 ft.
Roeser & Pendleton's No. 1 Johnson, 330 ft. from N, 3,870 ft. from W, Sec. 71, Blk. 1, H.&T.C. .....Cleaning out 2,980 ft.
The Texas Company's No. 1-B Stephens, 330 ft. from N and W of S half SW, Sec. 79, Blk. 1, H.&T.C.R.R. Sur. .....Drlg. 2,770 ft.

GAINES COUNTY

Louisiana O. & R. Co.'s No. 1 Ralph, 1,320 ft. from S and W of Sec. 7, Blk. A-28, Public School Land .....Location.

GARZA COUNTY

Bell Thompson's No. 1 Tuffing, 330 ft. from S, 2,310 ft. from E, Sec. 10, Blk. 6, H.&G.N. .....Drlg. 2,120 ft.
Paul Steed et al's No. 1 Boren, Sec. 136, Blk. 5, 330 ft. from N, 990 ft. from E, H.&G.N.R.R. Sur. .....Shut down 2,265 ft.

GLASSCOCK COUNTY

The California Co.'s No. 3 Currie, 990 ft. S and 2,310 ft. W of NE cor., Sec. 219, Blk. 29, W.&N.W.R.R. Sur. . Shut down 1,679 ft.
California Co.'s No. 1 Jones, 330 ft. S from N and E lines, Sec. 25, Blk. 33, Twp. 2s, T.P. Sur. .....Rig.
Chal Daniel et al's No. 1 Meek, 2,310 ft. W and 1,600 ft. N of SE cor, Sec. 7, Blk. 34, Twp. 3s, T.&P. Sur...Shut down 1,120 ft.
Fuhrman's No. 1 McDowell, 330 ft. from S and 1,650 ft. from E Sec. 24, Blk. 34, Twp. 2s, T.&P. .....Spudding.
Glasscock et al's No. 1 Edwards, 330 ft. from S, 1,650 ft. from E of Sec. 18 Blk. 33, Twp. 2s, T.&P.R.R. Sur..Location.
Houston Oil Co.'s No. 1 McDowell, 330 ft. from N and 2,310 ft. from E, Sec. 30, Blk. 33, Twp. 2s .....Shut down 2,603 ft
Kirby Pet. Co.'s No. 1 Baker, 330 ft. from N and W lines of Sec. 23, Blk. 33, Twp. 2s, T.P. Sur. .....Drlg. 1,580 ft.
Kirby Pet. Co.'s No. 2 Phillip, 330 ft. from N and W. Sec. 23, Blk. 33, Twp. 2s, T.&P.R.R. Sur. .....Location.
Landreth et al's No. 1 Huston, Sec. 29, Blk. 35, Twp. 2s, 330 ft. from S, 2,310 ft. from E, T.&P. Sur. ..... Shut down repairs 754 ft.
Lion O. & R. Co.'s No. 2 Coffee, 330 ft. from N and 990 ft. from E of Sec. 22, Blk. 33, Twp. 2s .....Location.
Midwest Oil Co.'s No. 1 Edwards, 330 ft. from S, 2,259 ft. from E, Sec. 20, Blk. 34, T.&P.R.R. Sur. .....Drlg. 3,025 ft.
Schermerhorn Oil Co.'s No. 1 Phillips, Sec. 25, Blk. 33, Twp. 2s, T.&P.R.R. Sur., 330 ft. N, 2,310 ft. E .....T. D. 2,291 ft., pumping 1,525 bbls. 17 hours.
Schermerhorn Oil Co.'s No. 2 Phillips, 330 ft. from N and 990 ft. from E of Sec. 23 Blk. 33, Twp. 2s .....Location.
Shell Pet. Corp.'s No. 1 Coffee, 330 ft. from S and 1,650 ft. from E of Sec. 15, Blk. 33, Twp. 2s .....Location.
Simms Oil Co.'s No. 1 Coffee, 330 ft. from N and 1,650 ft. from E of Sec. 22, Blk. 33, Twp. 2s, T.&P. .....Location.
E. L. Smith Oil Co.'s No. 2 Coffee, 330 ft. from S and 990 ft. from E of Sec. 15, Blk. 33, Twp. 2s, T.&P.....Location.
E. L. Smith's No. 1 Coffee, 330 ft. from S and E of Sec. 15, Blk. 33, Twp. 2s, T.&P. Sur. .....Drlg. 850 ft.
Sun Oil Co.'s No. 1 Phillips, Sec. 14, Blk. 33, Twp. 2s, 330 ft. from S, 2,310 ft. from W .....Total depth 2,292 ft.; flowed 49 bbls. 2 hours.
Sun Oil Co.'s No. 2 Phillips, 330 ft. from S and W lines, Sec. 14, Blk. 33, Twp. 2s, T.P. Sur. .....Drlg. 1,500 ft.
Sun Oil Co.'s No. 3 Phillips, 2,310 ft. from E and 330 ft. from S of Sec. 14, Blk. 33, Twp. 2s, T.&P. .. ..Building rig.
Texas State Oil Co.'s No. 1 Coffey, 330 ft. from S and 990 ft. from E, Sec. 19, Blk. 34, Twp. 2s .....Shut down 2,461 ft
World Oil Co.'s No. 2-C McDowell, Sec. 21, Blk. 34, Twp. 2s, 330 ft. S and 2,310 ft. E of NW cor. .....Rigging up

HOWARD COUNTY

American Maracaibo Co.'s No. 3-A Settles, Sec. 6, Blk. 32, Twp. 2s, 777 ft. from N, 990 ft. from W, T.&P. R.R. Sur. .....Rigging up.
California Co.'s No. 3 Roberts Lease No. 1, Sec. 137, Blk. 29, 1,654 ft. from S, 990 ft. from E, W.&N.W.R.R. Sur. .....Drlg. 2,953 ft.
Continental Oil Co.'s No. 6-C Chalk, 1,520 ft. from N and 2,440 ft. from E, Sec. 140, Blk. 29, W.&N.W. R.R. Sur. .....Location.
Continental Oil Co.'s No. 1 Kloh-Rumsey, 990 ft. S and 330 ft. W NE cor., Sec. 13, Blk. 33, Twp. 2s, T.&P. R.R. Sur. .....Drlg. 1,520 ft.
Continental Oil Co.'s No. 2 Kloh-Rumsey, 2,310 ft. S, 330 ft. W of NE cor. Sec. 13, Blk. 33, Twp. 2s, T.&P.R.R. Sur. .....Shut down 271 ft.
Continental Oil Co.'s No. 3 Kloh-Rumsey, 1,650 ft. S and 330 ft. W of NE cor. Sec. 13, Blk. 33, Twp. 2s, T.&P. Sur. .....Drlg. 1,900 ft.
Continental Oil Co.'s No. 9-A Settles, 220 ft. from N, 660 ft. from E, Sec. 135, Blk. 29, W.&N.W.R.R. Sur. .....Drlg. 1,814 ft.
Cosden Oil Co.'s No. 6 Roberts-A, 200 ft. N and E of SW cor., Sec. 129, Blk. 29, W.&N.W.R.R. Sur. .....Shut down 1,456 ft.
Godley Pet. Co.'s No. 6 Hooks, 1,520 ft. from N, 2,440 ft. from W, Sec. 140, Blk. 29, W.&N.W.R.R. Sur. .....Drlg. 1,650 ft.
Group No. 1 & Continental Oil Co.'s No. 7-A Settles, 1,650 ft. N and 2,310 ft. W of SE cor. Sec. 135, Blk. 29, W.&N.W.R.R. Sur. .....Rigging up 200 ft.
Group No. 1 & Continental Oil Co.'s No. 8-A Settles, 990 ft. N and 2,310 ft. W of SE cor. Sec. 135, Blk. 29, W.&N.W.R.R. Sur. .....Location.
Humble's No. 5 Clay, Sec. 138, Blk. 29, 330 ft. from S, 990 ft. from W .....Drlg. 1,768 ft.
Gulf Prod. Co.'s No. 8 Clay, 330 ft. S and 1,650 ft. W of NE cor. W half Sec. 155, Blk. 29, W.&N.W.R.R. Sur...Drlg. 1,320 ft.
Magnolia Pet. Co.'s No. 13 Dora Roberts, 2,440 ft. N and 1,650 ft. E of SW cor. Sec. 136, Blk. 29, W.&N.W. Sur. .....Shut down 2,927 ft.; set 8¼-in. casing.

Marland Prod. Co.'s No. 3 Clay-F, 250 ft. S and 660 ft. W of NE cor., Sec. 138, Blk. 129, W.&N.W.R.R. Sur...Shut down 2,675 ft. with show oil 2,595-2,675 ft.
Merriwether's No. 1 Smith, 150 ft. from S, 2,490 ft. from W, Sec. 45, Blk. 33 ....Shut down 1,100 ft.
Merrick & Bristow's No. 10 Roberts, Sec. 137, Blk. 29, 1,155 ft. from S, 1,980 ft. from W ....Drlg. 1,560 ft.
Merrick & Lamb's No. 9 Clay, 660 ft. from S and 360 ft. from E, Sec. 126, Blk. 29 ....Show oil 1,745-60 ft.; total depth 3,230 ft.; preparing to pump.
Moody Oil Corp.'s No. 29-B, Sec. 137, Blk. 29, 330 ft. from N and 1,650 ft. from W ....Shut down 348 ft.
Moody Oil Co.'s No. 18-B Roberts, 280 ft. S and 2,280 ft. E NW cor. Sec. 137, Blk. 29, W.&N.W.R.R. ....Shut down 1,401 ft.
Moody Oil Corp.'s No. 21-B Roberts, Sec. 137, Blk. 29, 2,310 ft. from N and 990 ft. from W, W.&N.W. Sur. ..Shut down 1,325 ft
Moody Oil Co.'s No. 23-B Roberts, 990 ft. from N and W of Sec. 137, Blk. 29 ....Shut down 361 ft.
Moody Oil Co.'s No. 19-E Roberts, 190 ft. from N and 2,310 ft. from E, Sec. 136, Blk. 29 ....Shut down 271 ft.
Moody Oil Corp.'s No. 20-E Roberts, 1,650 ft. S, 2,310 ft. W of NE Sec. 136, Blk. 29 ,W.&N.W.R.R. Sur. ....Elevation 2,787 ft.; spudding.
Plymouth Oil Co.'s No. 4 Abrams, 330 ft. from N and 1,650 ft. from W, Sec. 5, Blk. 32, Twp. 2s ....Top pay 2,480 ft.; 1,600 ft. oil in hole; shut down 2,519 ft.
Plymouth Oil Co.'s No. 5 Abrams, Sec. 5, Blk. 32, Twp. 2s, 1,650 ft. from N, 330 ft. from W, T.&P. ....Drlg. 2,272 ft.
Plymouth Oil Co.'s No. 6 Abrams, Sec. 5, Blk. 32, Twp. 2s, 1,650 ft. from S, 330 ft. from W, T.&P. ....Spudding.
Plymouth Oil Co.'s No. 7 Abrams, 2,310 ft. from N, 330 ft. from W, Sec. 5, Blk. 32, Twp. 2s, T.&P. Sur. ....Location.
Pure Oil Co.'s No. 1-A Scrivner, 990 ft. from W and 330 ft. from S of Sec. 4, Blk. 32, Twp. 2s ....Location.
Pure Oil Co.'s No. 2 Scrivner, 330 ft. from S and 1,650 ft. from W, Sec. 4, Blk. 32, Twp. 2s, T.P.R.R. Sur...Location.
Schmerhorn Oil Co.'s No. 1 Abrams, 2,310 ft. from S and 1,650 ft. from W, Sec. 13, Blk. 33, Twp. 2s, T.&P.R.R. Sur. ....Drlg. 780 ft.
Shell Pet. Corp.'s No. 1-B Settles, 1,650 ft. from S, 2,310 ft. from W, Sec. 135, Blk. 29, W.&N.W.R.R. Sur....T. D. 2,955 ft., preparing to test
Shell Pet. Corp.'s No. 1 Kloh-Rumsey, 2,310 ft. from S and 330 ft. from E, Sec. 13, Blk. 33, Twp. 2s, T.&P. R.R. Sur. ....Shut down 2,305 ft.
Shell Pet. Corp.'s No. 2 Abrams, Sec. 13, Blk. 33, Twp. 2s, 2,310 ft. from S, 990 ft. from E, T.&P. ....Rig.
Shell Pet. Corp.'s No. 2-A Roberts, 1,320 ft. from N, 1,650 ft. from W, Sec. 156, Blk. 29, W.&N.W.R.R. Sur. ....Underreaming 2,931 ft.
Simms Oil Co.'s No. 1 Clay, 330 ft. from S and 1,650 ft. from W Sec. 127, Blk. 29, W.&N.W.R.R. Sur. ....Location.
Simms Oil Co.'s No. 2 Clay, Sec. 127, Blk. 29, 300 ft. from S and 2,340 ft. from W ....Location.
Sprague Oil Co.'s No. 3 Roberts, 990 ft. from N and 330 ft. from W, Sec. 156, Blk. 29, W.&N.W.R.R. Sur. ....Shut down 1,730 ft.
Ward Oil Co.'s No. 13 Roberts, 2,430 ft. N and 1,590 ft. E of SW cor. Sec. 137, Blk. 29, W.&N.W.R.R. Sur. ...Location.
Ward Oil Co.'s No. 14 Roberts, 2,430 ft. from S, 2,010 ft. from W, Sec. 137, Blk. 29 ....Spudding.
Ward Oil Co.'s No. 15 Roberts, 2,430 ft. from S and W, Sec. 137, Blk. 29 ....Location.
Witherspoon's No. 3 Abrams, 920 ft. S, 723 ft. E, Sec. 3, Blk. 32 ....Shut down 2,030 ft.

HUDSPETH COUNTY

California Co.'s No. 1 University, 3,821 ft. N and 2,554 ft. E of SW cor., Sec. 19, Blk. E ....Drlg. 2,175 ft.
George Richardson's No. 1 Paxton, 2,640 ft. from N and W, Sec. 9, Blk. 16 ....Shut down 205 ft.
Western States Oil Co.'s No. 1 Moore, C SE Sec. 16, Blk. 71, Twp. 6, T.&P. Sur. ....Shut down 2,685 ft.
Western States Oil Co.'s No. 1 Gardner & Moseley, NE NW, Sec. 12, Blk. 18 ....Fishing 3,140 ft.

IRION COUNTY

Banner's No. 2 Nutt, Subdivision 5, 150 ft. from N and E of W half Gonzales County School Lands ....Location.
Brown & Fox's No. 2 Tankersley, 160 ft. from N and 500 ft. from E lines of S half of Sec. 712, F. Willig Sur. ....Location.
Crawford Oil Co.'s No. 1 Williams, 460 ft. from N, 150 ft. from W, Subd. 8 ....Drlg. 1,070 ft.
Carl Cromwell's No. 1 Nutt, 150 ft. from N, 1,160 ft. from W. Subd. 6, Gonzales County School Land ....Drlg. 1,355 ft.
Carl Cromwell's No. 1 Tankersley, 2,490 ft. from S and E, Sec. 1,219, T.C.R.R. Sur. ....Rigging up.
Fox & Miller's No. 1 Tankersley, 150 ft. from S, 1,250 ft. from W, Sec. 711, I. G. Resig ....Drlg. 950 ft.
Fuhrman Pet. Co.'s No. 1 Nutt, 150 ft. from N and W, Subd. 4 ....Drlg. 1,085 ft.
Kimbrough & Flinchbaugh's No. 1 Tankersley, 160 ft. S and 200 ft. W of NE cor. S half, Sec. 712, Ford Willig Sur. ....Show oil 1,318-29 ft.; total depth 1,335 ft.; averaging 60 bbls. daily 37 degrees gravity oil; shut down for storage.
Kingwood Oil Co. et al's No. 1 J. D. Suggs, SE NW SE Sec. 19, Blk. 7, H.&T.C. Sur. ....Show gas 7,656 ft.; set 4½-in. casing 7,550 ft.; total depth 7,677 ft.; drlg. plug.
Simms Oil Co.'s No. 1 Carter, Sec. 87, Blk. 1, 330 ft. from N and E, H.&T.C.R.R. Sur. ....Drlg. 400 ft.
J. A. Starkweather's No. 1 Lindley, Sec. 1,160½, 900 ft. from S, 150 ft. from E, H.&T.C. Sur. on E ....Drlg. 60 ft.
P. H. Williams' No. 1 Ash, C of Sec. 20, Washington County ....Cleaning out 3,535 ft

JEFF DAVIS COUNTY

J. K. Hughes Dev. Co.'s No. 2 Means, 1,622 ft. N line, 600 ft. W line, Sec. 345, H.&T.C. Sur. ....Show gas 3,271 ft.; fresh water 3,000-05 ft.; underreaming 5 3/16-in. casing; shut down 4,005 ft.; 600 ft. fresh water 4,000-36 ft.

JONES COUNTY

J. H. Adsit et al's No. 1 Swenson, C of NE of SE, Sec. 193, B.B.B.&C. Sur. ....Underreaming 6-in. casing 1,765 ft.
Cosden-Herbert et al's No. 3 Bickley, 330 ft. N and W of SE cor. of S half NW, Sec. 50, Blk. 18 ....Rig.
Sedgwick O. & G. Co.'s No. 1 Morrison, 300 ft. from S and 1,320 ft. from W of Sec. 9, Blk. 1, T.&N.O. ....Shut down 2,167 ft.
Shabeen et al's No. 1 King ....Drlg. 1,555 ft.

KENT COUNTY

White & Smith's No. 1 Pursley estate, 1,320 ft. from E and 2,640 ft. from S of Sec. 8, Blk. H, H.&T.B. ....Drlg. 150 ft.

KIMBLE COUNTY

C. L. Bryant et al's No. 1 Lambert, 700 ft. from N and W line of F. Lotta Sur. ....Shut down 800 ft.
McLean & Jamison's No. 1 Cannon, 1,940 ft. N and 300 ft. W of SE cor. Robert Cochran Sur. ....Shut down 1,504 ft.

LOVING COUNTY

Humble Oil & Ref. Co.'s No. 1 Kloh, 2,640 ft. N and W Sec. 35, Blk. 55, Twp. 2, T.&P.R.R. Sur. ....Drlg. 385 ft.; hole full water 360 ft.
Independent O. & G. Co.'s No. 1 Wheat, 330 ft. each way from W cor. of Sec. 35, Blk. 1, W.&N.W. ....Location.
Lockhart Co.'s No. 3 Allen, 330 ft. from NE, 1,650 ft. from NW, Sec. 82, Blk. 33, H.&T.C. ....Location.
Lockhart & Co.'s No. 3 Hubbard, 330 ft. from NE and SE, Sec. 83, Blk. 33, H.&T.C. ....Top salt 775 ft.; shut down 1,950 ft.
Lockhart & Co.'s No. 4 Hubbard, 1,660 ft. NE, 330 ft. NW, Sec. 83, Blk. 33, H.&T.C. ....Drlg. 1,135 ft.; cementing 10-in. casing 690 ft.
Lockhart & Co.'s No. 1 Hayzell, 2,792 ft. SW of NE line and 660 ft. NW of SE line, Sec. 84, Blk. 33, H.&T.C. R.R. Sur. ....Top salt 700 ft.; drlg. cement plug, anhydrite and gray lime.

LYNN COUNTY

Lubewell Oil Co.'s No. 1 May, 2,310 ft. S, 2,310 ft. W, Sec. 10, Blk. 7, E.L.R.R. ....Shut down 190 ft. for casing.
George McCamey's No. 1 Edwards, 165 ft. N and E, Sec. 6, Blk. 2, L.S.&W. Sur. ....Top salt 2,140 ft.; oil show 1,580-90 ft.; cem. 8-in. casing 2,500 ft.; shut down 4,650 ft.

MENARD COUNTY

J. C. Barnett's No. 2 Callan, Sec. 1, 1,050 ft. from S, 1,190 ft. W ....Shut down 540 ft.

MITCHELL COUNTY

Seiger's No. 1 Scott, C of NE of SW, Sec. 36, Blk. 17, S.P.R.R. Sur. ....Shut down 730 ft.
Texas & Wheeler's No. 1 Radford, 1,320 ft. N and W of Sec. 1, Blk. 27, T.&P. Sur. ....Running 6⅝-in. casing; total depth 4,154 ft.

NOLAN COUNTY

Gibson & Johnson's No. 1 Bond, 1,320 ft. from N and 1,980 ft. from E of Sec. 42, Blk. 20, T.&P. ....Drlg. 400 ft.
Phillips Pet. Co.'s No. 1 Plunkett, 330 ft. N and W of SE cor. NW, Sec. 66, Blk. 23, T.&P. Sur. ....Hole full sulphur water 3,685 ft.; drlg. 3,960 ft.

PECOS COUNTY

California Co.'s No. 3 Smith, Lease No. 5, Sec. 16, Blk. 194, 337 ft. from S and 166 ft. from E, G.C. &S.F. Sur. ....Location.
California Co.'s No. 4 Smith lease No. 1, 1,018 ft. from N and 330 ft. from E, Sec. 37, Blk. 194, G.C.&S.F.... Rig.
California Co.'s No. 5 Smith, Lease No. 1, 330 ft. from N, 2,405 ft. from W, Sec. 21, Blk. 194, G.C.&S.F. ....Drlg. 1,316 ft.
California Co.'s No. 3 Smith, Lease No. 1, 330 ft. from S and 3,097 ft. from W, Sec. 23, Blk. 194, G.C.&S.F....Drlg. 1,583 ft.
California Co.'s No. 1 University-Landrum, Sec. 12, Blk. 13, 330 ft. from S, 1,065 ft. from E, University Land..Drlg. 1,030 ft.
Continental Oil Co.'s No. 1-A University, 1,320 ft. from N and W of Sec. 6, Blk. 17 ....Top salt 790 ft.; top pay 990 ft.; total depth 996 ft.; 140 bbls. oil 8 hours.
Cosby Drlg. Co.'s No. 1 Fort Stockton Land Co., 330 ft. from N and E of Sec. 34, Blk. 11, H.&G.N. ....Location.
Cosden Oil Co.'s No. 1 McDonald, 350 ft. from N and E of Sec. 1, H.E.&W.T. ....Location.
Cowboy Evans' No. 1 Pecos Valley, 2,310 ft. from NW line, 990 ft. from SW line of Sec. 36, Blk. 3, H.&T.C. R.R. Sur. ....Top salt 1,315 ft.; total depth 1,563 ft.; top pay 1,556 ft.; flowed 10 bbls. after standing 4 hrs.
Cranfill & Reynold's No. 1 White, 330 ft. from S and W Sec. 104, Blk. 11 ....Rig.
Ditman Drlg. Co. et al's No. 1 Cunningham, 330 ft. from N and E of Sec. 34, Blk. 11, H.&G.N. ....Location.
Dixie Oil Co.'s No. 1 McKinzie, 3,300 ft. from N and 2,025 ft. from W of Sec. 15, Blk. 604, G.C.&S.F. ....Location.
Gibson-Johnson's No. 1 Grace, 330 ft. N, 990 ft. from E, Sec. 3, Blk. 179 ....Shut down 1,793 ft.
Gulf Prod. Co.'s No. 1 State-Hale-A, 330 ft. S and W of NE cor., Sec. 16, Blk. 20, University Land ....Drlg. 785 ft.
Gulf Prod. Co.'s No. 21-A Smith, 1,544 ft. N and 330 ft. W of SE cor. Sec. 28, Blk. 194, G.C.&S.F.R.R. Sur. ...Spudding.
Gulf Prod. Co.'s No. 20-B Smith, Sec. 22, Blk. 194, 330 ft. from N, 2,322 ft. from E, G.C.&S.F. ....Underreaming 1,035 ft.
Gulf Prod. Co.'s No. 25 Yates, 1,015 ft. N and 3,083 ft. E of SW cor., R. C. School Land ....Drlg. 525 ft.
Henshaw et al's No. 1 University, 330 ft. from N and W of NE, Sec. 13, Blk. 18 ....Drlg. 460 ft.
Henshaw et al's No. 2 University, 330 ft. from N and E lines of NW of NE of Sec. 13, Blk. 18 ....Location.
Henshaw et al's No. 3 University, 330 ft. from S and E of NW of NE of Sec. 13, Blk. 18 ....Location.
Henshaw et al's No. 4 University, 330 ft. from S and W of NW of NE of Sec. 13, Blk. 18 ....Location.
Henshaw Oil Corp.'s No. 1 McDonald, 330 ft. from N and W of S.169 ac. of N 189 ac., Sec. 2, H.E.&W.T. ....Driving pipe 270 ft.
Humble O. & R. Co.'s No. 11 M. A. Smith, 330 ft. from S and 2,150 ft. from E of Sec. 36, Blk. 194, G.C. &S.F. ....Drlg. 835 ft.
Independent & Rowan & Tong's No. 2 McDonald, 153 ft. from W line and 170 ft. from N line of S half NE Sec. 46, Blk. 12 ....Spudding 60 ft.
Independent & Rowan & Tong's No. 3 McDonald, 330 ft. from S and W line of NE Sec. 46, Blk. 12 ....Drlg. 430 ft.
Jayhawk Oil Co.'s No. 1 Price, 1,310 ft. from W, 330 ft. from S, Sec. 6, Blk. 12, H.&G.N.R.R. Sur. ....Shut down 190 ft.
J. L. Kennedy's No. 1 Roberts, C of Sec. 78, Blk. 3, T.&P.R.R. Sur. ....Shut down 490 ft.
Sam Kitts et al's No. 1 Sherbino, 330 ft. from N and 990 ft. from W line, Sec. 52, Blk. C-4, G.C.&S.F.R.R.. Top salt 976 ft.; drlg. 2,000 ft.
Landreth's Prod. Co.'s No. 1 University, 330 ft. from N and W lines of E half of SE, Sec. 13, Blk. 18, University Land ....Shut down 950 ft.; estimated 60,000,000 ft. gas at 940 ft.; ris burned; shut in.
Landreth Prod. Co.'s No. 1-C University, 330 ft. from N and E, NW of SW of Sec. 31, Blk. 16 ....Drlg. 130 ft.
Landreth Prod. Co.'s No. 2-C University, 330 ft. from N and W of NW of SW, Sec. 31, Blk. 16 ....Drlg. 270 ft.
Landreth Prod. Co.'s No. 1-D University, 990 ft. from S and 990 ft. from W of Sec. 31, Blk. 16 ....Drlg. 215 ft.
Landreth Prod. Co.'s No. 1 McDonald, Sec. 46, Blk. 12, 2,310 ft. from S and E, H.&G.N.R.R. Sur. ....Drlg. 610 ft.
Landreth Prod. Co.'s No. 2-A McDonald, 330 ft. from N and E of Sec. 46, Blk. 12, H.&G.N. ....Location.
Landreth & World Oil Co.'s No. 2-B University, Sec. 13, Blk. 18, 660 ft. S of No. 1 University Land ....Drlg. 350 ft.
Landreth Prod. & World Oil Co.'s No. 4-B University, 330 ft. S and W of NE SE NE Sec. 13, Blk. 18, University Land ....Location.
Landreth Prod. & World Oil Co.'s No. 5-B University, 330 ft. N and W of SE NE Sec. 13, Blk. 18, University Land ....Location.
Landreth Prod. Co.'s No. 3-B University, 330 ft. from S and E of NE Sec. 13, Blk. 18 ....Drlg. 375 ft.
Merrick & Bristow's No. 1 Neville, 1,650 ft. from S and 330 ft. from W of Sec. 42, Blk. 12, H.&G.N. ....Rig.
Phillips Pet. Co.'s No. 4 Ramsey, 2,722 ft. from N and 1,980 ft. from E of Sec. 17, Blk. 199, G.C.&S.F. ....Location.
Seminole Oil Co.'s No. 1 Pecos Valley, Sec. 22, Blk. 10, 360 ft. from SW, 2,280 ft. from SE, H.&G.N. Sur. ...Location.
Mauch & Kroger's No. 1 Holmes, Sec. 5, Blk. 178, T.C. Sur. ....Shut down 1,442 ft
McMan Oil & Gas Co.'s No. 5 Richardson, Sec. 107, 330 ft. N, 200 ft. W of SW cor., Sec. 101, T.C.R.R. Sur. .. Drlg. 350 ft.
Milham Exploration Co.'s No. 1 McDonald, 153 ft. from S and 170 ft. from E of N half of NW, Sec. 46, Blk. 12, H.&G.N. ....Drlg. 115 ft.
Merrick-Bristow's No. 1 Neville, 330 ft. from S and W, Sec. 42, Blk. 12, H.&G.N.R.R. Sur. ....Rigging up
McMan Oil & Gas Co.'s No. 8-C Smith, 1,667 ft. S and 330 ft. W of NE cor., Sec. 25, Blk. 194, G.C.&S.F. R.R. Sur. ....Rig.

McMan Oil & Gas Co.'s No. 9-C Smith, 3,647 ft. S and 330 ft. W of NE cor. Sec. 25, Blk. 194, G.C.&S.F. R.R. ..... Drlg. 680 ft.

R. E. Moore's No. 1 Arnold, 1,320 ft. from S and 660 ft. from E lines of Sec. 18, Blk. 1, H.&T.C.R.R. ..... Shut down 1,218 ft; 1,100 ft. oil in hole.

Moncrief's No. 1 Clarkson, Sec. 84, Blk. 11, H.&T.N.R.R. Sur., 2,310 ft. from N and W ..... Drlg. 370 ft.

Moncrief et al's No. 1 Tippett, 330 ft. from S, 330 ft. E of C, Sec. 36, Blk. 12, H.&G.N. ..... Location.

Moncrief's No. 5 Tippett, 330 ft. N and 200 ft. W of SW cor., Sec. 101, located in Sec. 107, C.T.&M.C.R.R. Sur... Location.

Moncrief et al's No. 1 University, 1,470 ft. from N and 150 ft. from E, Sec. 27, Blk. 18, University Land .... Shut down 1,877 ft.

George Morgan's No. 2 Toborg, Sec. 539, Blk. 1, 150 ft. S of Moncrief's No. 1 ..... Shut down 417 ft.

Mid-Kansas Oil & Gas Co.'s No. 7 Smith, 330 ft. N and 227 ft. E of NW cor., Sec. 21, Blk. 194, G.C.&S.F. ... Drlg. 535 ft.

Mid-Kansas Oil & Gas Co.'s No. 32 Yates-A, 225 ft. N of most southerly N line and 1,308 ft. E of most western E line, Sec. 32, Blk. 194, I. G. Yates Sur. A-8,195 ..... Location.

Mid-Kansas Oil & Gas Co.'s No. 3-E Yates, Sec. 59, Blk. 1, 1,335 ft. from N and 964 ft. from W, I.&G.N... Drlg. 590 ft.

S. B. Owen's No. 1 Masterson, 330 ft. NE of SW line and 330 ft. NW of SE of Sec. 104, Blk. 10, H.&G.N... Location.

J. D. O'Mara's No. 1 Bennett, Sec. 592, 1,460 ft. from S, 150 ft. from E, G.C.&S.F. ..... Fishing 875 ft.

J. D. O'Mara's No. 1 Streety, C of Sec. 1, W. P. Howard Sur. ..... Shut down 825 ft.

Pecos Crude Oil Pur. Co.'s No. 3 Pecos Valley, 990 ft. from NW, 1,650 ft. from SW, Sec. 22, Blk. 10 ..... Top salt 1,115 ft.; top pay 1,610 ft.; 75 ft. oil in hole; show gas at 1,597 ft. and 1,626 ft.; total depth 1,950 ft.; flowing 30 bbls. after shot; fishing pipe.

Perrin et al's No. 1 Eaton, 150 ft. each way from NE and NW lines, Sec. 27, Blk. 29, H.&T.C. Sur. ..... 18,000,000 ft. gas 1,490-1,502 ft.; spraying salt water from behind 8-in. casing set at 1,180 ft.; shut down 1,502 ft.; 5 3/16-in. casing set on bottom with last joint perforated; 18,000,000 ft gas shut in.

Perren's No. 1 Peterson, 150 ft. from NW, 150 ft. from SW, Sec. 34, Blk. 10, H.&T.C. ..... Show oil and gas 1,787 ft.; top salt 900 ft.; drlg. 2,267 ft.

Phillips Pet. Co.'s No. 2 Pryor, 660 ft. from N and W line, Sec. 78, Blk. OW ..... Drlg. 145 ft.

Phillips Pet. Co.'s No. 3 Ramsey, 2,635 ft. from N and 1,070 ft. from E of Sec. 17, Blk. 194, G.C.&S.F. ..... Location.

B. J. Spikes' No. 1 George Brown, 2,490 ft. SE and SW line, Sec. 8, Blk. 3 ..... Show oil 1,180-90 ft.; shut down 2,359 ft.

Red Bank Co.'s No. 1 Neville, 330 ft. from S and W Sec. 40, Blk. 12, H.&G.N. ..... Rig.

M. M. Rowan's No. 1 University, NE Sec. 25, Blk. 16 ... Drlg. 1,920 ft.; flowing sulphur water 1,835 ft.

Schumaker et al's No. 1 Williams et al, 320 ft. N of middle of S line, Sec. 1, Blk. 117, G.C.&S.F. ..... Shut down 1,665 ft.

Shell Pet. Corp.'s No. 1 Owen et al, 220 ft. each way from E cor. Sec. 16, Blk. 5, H.&T.C. ..... Location.

Sides & Cloyd's No. 2 Blackstone & Slaughter, C NW of Sec. 34, Blk. A-2, T.&C.R.R. Sur. ..... Location.

Shell Pet. Corp.'s No. 2-C University Land, 330 ft. S and E of SW of NW Sec. 31, Blk. 16, University Land ... Location.

Shell Pet. Corp.'s No. 3-C University, 330 ft. N and W of SE of SW of NW Sec. 31, Blk. 16, University Land ..... Location.

Shell Pet. Corp.'s No. 4-C University, 330 ft. N and E of SW of SW NW of Sec. 31, Blk. 16, University Land ..... Location.

Southern Crude O. P. Co.'s No. 1 Jackson T-139, Sec. 28, Blk. 3, 1,487 ft. from NE, 2,519 ft. from SE cor..... Location.

Sun Oil Co.'s No. 1 University-Carlson, Sec. 34, Blk. 18, 990 ft. from N and 1,350 ft. from W, University ..... Drlg. 1,140 ft.; underreaming 8-in. casing.

Sun Oil Co.'s No. 1 University-Toler, Sec. 25, Blk. 18, 330 ft. from N and 2,310 ft. from E ..... Drlg. 500 ft.

Sun Oil Co.'s No. 2 University, Sec. 8, Blk. 17, 330 ft. from N and 353 ft. from W, University Land ..... Drlg. 1,555 ft; 1 bailer sulphur water 1,520-30 ft.

Talbot et al's No. 1 Unsicker, 150 ft. each way from NE and SE cor. line of Sec. 25, Blk. 10, H.&G.N. Sur. ..... Material on ground.

Taylor-Link's No. 3 University, Sec. 31, Blk. 16, 330 ft. from N and W ..... Total depth 1,622 ft; top pay 1,589 ft.; flowed 13 bbls. oil.

Taylor-Link's No. 4 University, Sec. 31, Blk. 16, 990 ft. from N and 1,050 ft. from W ..... Drlg. 1,300 ft.

Taylor-Link's No. 5 University, 990 ft. from N and 330 ft. from W of Sec. 30, Blk. 16 ..... Drlg. 60 ft.

Taylor-Link's No. 6 University, 330 ft. from N and 330 ft. from E of W half of SE, Sec. 13, Blk. 18 ..... Drlg. 311 ft.

Taylor-Link Oil Co.'s No. 7 University Land, 330 ft. S and W of NE cor. of W half, Sec. 31, Blk. 16, University Land ..... Location.

The Texas Co.'s No. 1 McDonald, NE cor. of SW, Sec. 46, Blk. 12 ..... Drlg. 510 ft.

Texas-Phillips' No. 1 Campbell, 1,320 ft. from SW, 330 ft. from SE, Sec. 46, Blk. 10, H.&G.N. ..... 1,000 ft. oil in hole; oil from 1,710-13 ft.; hole fills 250 ft in 12 hrs.; drlg. 2,084 ft.

Tidal Oil Co.'s No. 1 McDonald, 153 ft. from N and 170 ft. from E of S half NW, Sec. 46, Blk. 12 ..... Drlg. 665 ft.

Tidal Oil Co.'s No. 2 McDonald, 330 ft. from S and E lines of S half NW, Sec. 46, Blk. 12 ..... Drlg. 390 ft.

Tidal Oil Co.'s No. 2 University, 2,970 ft. from N, 2,310 ft. from E, Sec. 3, Blk. 18, University Land ..... Drlg. 2,041 ft.

Tower & McKanna's No. 1 University, Sec. 14, Blk 16, 2,310 ft. from N and E ..... Running 8¼-in. casing 1,475 ft.

Transcontinental Oil Co.'s No. 1 University, NE NW SW Sec. 18, Blk. 18 ..... Top lime 1,155 ft.; drlg. 4,511 ft.

Trees Oil Co.'s No. 2 Trees, 330 ft. from N and W of SE cor., Sec. 43, Blk. 8, H.&G.N.R.R. Sur. ..... Drlg. 1,720 ft.

Trees Oil Co.'s No. 3 Trees, 330 ft. from S and W of Sec. 90, Blk. 8, H.&G.N. ..... Location.

R. D. Webb's No. 2 fee, 1,665 ft. from N and 951 ft. from E line of Sec. 312, L. P. Scott Sur. ..... Shut down 875 ft.

World Oil Co.'s No. 1 University, 330 ft. from N and 2,310 ft. from E of Sec. 31, Blk. 16, University Land.. Making 7 bailers oil hourly 1,395-1,405 ft.; T. D. 1,546 ft., setting pipe.

Zoch et al's No. 1 Cordova Union Land Co., C of SW Sec. 81, Blk. 11, H.&G.N. ..... Location.

PRESIDIO COUNTY

L. C. Brite's No. 4 Brite, 271 ft. from N, 1,188 ft. from E, Sec. 245, Blk. 4 ..... Shut down 670 ft.

Eastland Oil Co.'s No. 1 Tootle, C Sec. 17, Blk. 1, D.P. R.R. Sur. ..... Spudded; shut down.

T. P. Coal & Oil Co.'s No. 1 Bogel, 330 ft. S and W, Sec. 83, Blk. 8, G.H.&S.A. ..... Drlg. 1,700 ft.

REAGAN COUNTY

Big Lake Oil Co.'s No. 1-C University, 2,598 ft. S and 250 ft. W of NE cor., Sec. 1, Blk. 2, University Land.. Top pay 2,903 ft.; 1,000 ft. fluid in hole; drlg. 5,765 ft.

Kemrow Co.'s No. 1 Sawyer Cattle Co., 1,320 ft. from N and 1,980 ft. from E line, Sec. 8, J. G. Robinson Sur. ..... Location.

Thomas & Brann et al's No. 1 Hughes, C NE of Sec. 7, Blk. 1, T.C.R.R. Sur. ..... Location.

Skelly Oil Co.'s No. 4 University-Grayson, Sec. 33, Blk. 8, 990 ft. W and 660 ft. N of No. 2 ..... Drlg. 2,625 ft.

REEVES COUNTY

Exploration Co.'s No. 1 A. A. Kinney, 1,500 ft. W of NE cor. Sec. 26, Blk. C-18, Public School Land, elev. 2,847 ft. ..... Drlg. by 30 ft. off bottom 2,990 ft.

H. T. Hansford's No. 1 Williams, 150 ft. from S and W, Sec. 17, Blk. 6, H.&G.N. ..... Spudded and shut down.

Black & Fink's No. 1 Brooks, 1,980 ft. N and 660 ft. W, Sec. 16, Blk. 59 ..... Shut down 500 ft.

Southern Crude O. P. Co.'s No. 1 Kloh-Rumsey, 2,310 ft. N and W SE cor., Sec. 23, Blk. 51 ..... Drlg. 3,500 ft.

David R. Thompson's No. 1 A. A. Eddins, Sec. 9, Blk. C-1 ..... Drlg. by casing 5,490 ft.

RUNNELS COUNTY

Gibson-Johnson's No. 1 Woods, Sec. 529, 2,600 ft. from S and 300 ft. from E, T. T. Williams Sur. ..... Drlg. 240 ft.

Vacuum Oil Co.'s No. 4 McMillan, 555 ft. S and 717 ft. W of NE cor., Lot 22, Domingo Diaz Sur., No. 532.. Location.

SCHLEICHER COUNTY

Fort McKavet's No. 1 Tisdale, Sec. 1,499, River Section, 3,630 ft. from S, 150 ft. from W ..... Set 6-in. casing 3,023 ft.; shut down 3,500 ft.

Interstate's No. 1 Whitten, 1,320 ft. from N and W, Sec. 35, Blk. LL, T.C.R.R. Sur. ..... Hole slopped over with oil at 4,925 ft.; made one good flow; set 6-in. casing 5,050 ft.; drlg. 5,340 ft.; drlg. cement plug.

George Wilson's No. 1 Page, Sec. 40, Blk. L, 1,290 ft. from N, 1,470 ft. from W, G.H.&S.A.R.R. ..... Rigging up.

Underwood's No. 1 Tisdale, 2,095 ft. N and 1,185 ft. from E, Sec. 74, Blk. LL ..... Spudded and shut down

SCURRY COUNTY

Byrd & Harmon's No. 1 Murphy, Jr., 330 ft. from N and E of Sec. 114, Blk. 97, H.&T.C. ..... Drlg. 560 ft.

Camp Spring Oil & Ref. Co.'s No. 3 Guinn, 1,300 ft. from S, 300 ft. from E, Sec. 12, Blk. 3, H.&T.C.R.R. Sur. ..... Drlg. 1,115 ft.

Cottingham & Briscoe's No. 1 Trees, C SE Sec. 147, Blk. 97 ..... Drlg. 2,197 ft.

L. B. Mimms et al's No. 1 J. J. Koonsman, Sec. 216, Blk. 2, H.&T.C. Sur. ..... Spudded and shut down 800 ft.

G. E. Dickman and R. B. Pender et al's No. 1 F. C. Davis, 1,000 ft. N and 1,770 ft. W of SE cor. of Sec. 275, Blk. 2, H.&T.C. Sur. ..... Shut down 3,750 ft.

Texas-Canadian's No. 1 Moore, 1,320 ft. from S and W Sec. 379, Blk. 97 ..... Location

STERLING COUNTY

Sherwood B. Owen's No. 1 Tweedle, 1,980 ft. from N and 1,320 ft. from E of Sec. 10, Blk. T. T.&P. ..... Location.

SUTTON COUNTY

Independent Oil & Gas Co.'s No. 1 Willson, Sec. 30, Blk. A, 1,650 ft. from N, 2,310 ft. from W ..... Location.

Independent & Sun Oil Co.'s No. 1 Allison, Sec. 39, Blk. A, 200 ft. from N and 1,000 ft. from W ..... Drlg. 324 ft.

Phillips Pet. Co.'s No. 1 A. G. Holman, 2,310 ft. S and 330 ft. W NE cor., Sec. 25, G.C.S.D.&N.G.R.R. Sur..... Fishing 6,635 ft.; making 1,500,000 ft. gas 6,635 ft.

L. G. Priest's No. 1 Allison, 1,320 ft. N and E of SW cor. Sec. 52, Blk. A, T.&P. Sur. ..... Set 15-in. casing 530 ft.; drlg 3,920 ft.

TAYLOR COUNTY

Condor Pet. Co.'s No. 1 Brookerson, 765 ft. from E and 200 ft. from S of A. M. Boyd Sur. No. 112 ..... Drlg. 2,030 ft.

Dunnigan & Shell Pet. Corp.'s No. 1 Davidson, 2,811 ft. S and W of NE cor. S half of W. R. Willis Sur. No. 122 ..... Drlg. 2,170 ft.

John B. Jameson's No. 1 Webb, 1,170 ft. S and W of NE cor. Sec. 46, Lunatic Asylum Land ..... Show oil 4,917 ft.; shut down 4,960 ft.

TERRELL COUNTY

Big Bend Oil Co.'s No. 1 Bassett, C NW Sec. 155, Blk. D, M.K.&T.R.R. Sur. ..... Shut down 1,150 ft.

Keck Pecos Trust Co.'s No. 1 Hamilton, C Sec. 6, Blk. D-7, E.L.R.R. Sur. ..... Shut down 2,765 ft.

Mrs. J. B. McPhee's No. 1 Sam Belt, C Sec. 78, Blk. D-7, E.L.R.R. Sur. ..... Shut down 880 ft.

Milham Exploration Co.'s No. 1 Bassett, Sec. 76, Blk. Y, W. E. Robertson Sur. ..... Cem. 6⅝-in. casing 3,986 ft.; underreaming 5,475 ft.

Woodley & Jones' No. 1 Pankenham, C SE NW, Sec. 48, Blk. B-2, C.C.S.D.&N.G.R.R. Sur. ..... Shut down 625 ft.

TERRY COUNTY

Kingsland O. P. Co.'s No. 1 Brownfield, C NW SW SW Sec. 7, Blk. 1-A, E.L.R.R. Sur. ..... Fishing bailer 5,080 ft.

TOM GREEN COUNTY

Cannon et al's No. 1 Rust, 990 ft. S, 990 ft. W of NE cor. of Sec. 745 ..... Rig.

Fitzgerald & Taliaferro's No. 1 Bennett, C SW Sec. 1,628, E. H. Ringer ..... Shut down 2,395 ft.

Fuhrman Pet. Co.'s No. 1 Wardlaw, 2,650 ft. from N and E of Sec. 6, Blk. 17, H.&T.C. ..... Location

UPTON COUNTY

Dixie Oil Co.'s No. 31 Burleson, 330 ft. from N and 660 ft. E, Sec. 2 ..... Drlg. 2,054 ft.

Gulf Prod. Co.'s No. 2 Hughes, 150 ft. N and 255 ft. E of SW cor., Lease "B," W. Teer Sur. No. 4, A-806 ... Drlg. 900 ft.

Prairie Oil & Gas Co.'s No. 1 Quatters, 330 ft. from S and 1,980 ft. from W, C. C. Dewitt Sur. ..... Drlg. 3,938 ft.

Pure Oil Co.'s No. 2 Hughes, Sec. 4, 150 ft. from N and W line of lease ..... Location.

Pure Oil Co.'s No. 3 Hughes, 150 ft. from N, 765 ft. from W of lease, Sec. 4 ..... Location.

T. P. Coal & Oil Co.'s No. 13-A Lane, 330 ft. from S, 660 ft. from E of No. 5-A ..... Shut down 1,889 ft.

T. P. Coal & Oil Co.'s No. 1 Sherek, 330 ft. from S and E of Sec. 1, Blk. 3, M-K-T ..... Building rig.

White Eagle's No. 2 Hughes, 150 ft. from S and W of lease, Sec. 4, Wm. Teer ..... Drlg. 230 ft.

VAL VERDE COUNTY

Independent Operators' No. 1 Whitehead, SE SE, Sec. 30, Blk. 4, I.&G.N. Sur., elev. 1,175 ft. ..... Shut down 4,850 ft.

O. O. Owens, No. 1 Mills, Sec. 128, Blk. 1, I.&G.N. Sur., elev. 2,130 ft. ..... Gas sand 2,491-2,520 ft.; tested 125,700 ft. gas; reset 8-in. 2,511 ft.; total depth 4,210 ft.; cleaning out.

Phantom Oil Co.'s No. 1 Ingram, 175 ft. W of E line and 360 ft. N of S line Sec. 44, Blk. D-8, E.L.&R.R. Sur. .. Spudding.

Dyar Bros. et al's No. 1 Wilson, 6,830 ft. N NE cor., Sec. 1, T.&P. Sur., thence 1,680 ft. E, Sec. 115, Blk. E, G.C.&S.F. Sur. ..... Drlg. 3,594 ft.; cement plug.

Valvert Oil Corp.'s No. 1 Bassett, C NE, Sec. 47, Blk. Y.. Set 15½-in. casing 767 ft.; set 10-in. casing 1,510 ft.; shut down 4,009 ft.

WARD COUNTY

Alpine Oil & Gas Co.'s No. 1 Boogher, 1,980 ft. SE and NE, Sec. 11, Blk. 5, H.&T.C. ..... Top salt 760 ft.; cem. 8-in. casing 758 ft.; drlg. 2,065 ft.

Atlantic et al's No. 1 Dorr, 1,730 ft. S, 990 ft. W, Sec. 2, J. Howe ..... Spudding.

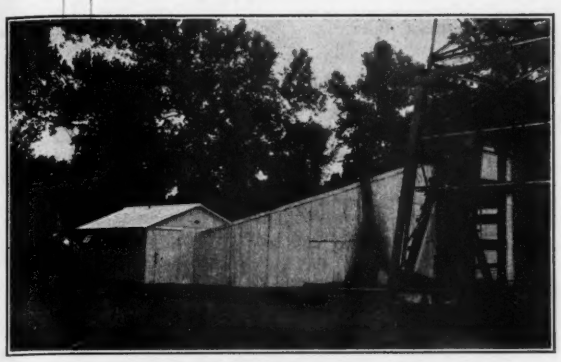
Barstow Oil & Gas Co.'s No. 1 Monroe, Sec. 50, Blk. 33. Spudded and shut down.

J. C. Dorr et al's No. 1 Costley, 1,722 ft. from NW, 990 ft. from NE line of Sec. 2, Jos. Howe Sur. ..... Spudded and shut down.

Cranfill & Reynolds' No. 1 Robeson, 220 ft. NW and NE Sec. 15, Blk. 5, H.&T.C. ..... Drlg. 1,785 ft.

STANDARD OF THE OIL INDUSTRY

FROM PRODUCTION TO DISTRIBUTION
A STANDARD STEFCO BUILDING FOR EVERY PURPOSE



STEFCO STANDARD ENGINE AND BELT HOUSE
STEFCO Engine and Belt Houses, like all STEFCO buildings, are built on the sectional principle of design which reduces erection costs to a minimum. They are of all steel construction and are fire and lightning safe.

Compressor Buildings
Boiler Houses
Pump Houses
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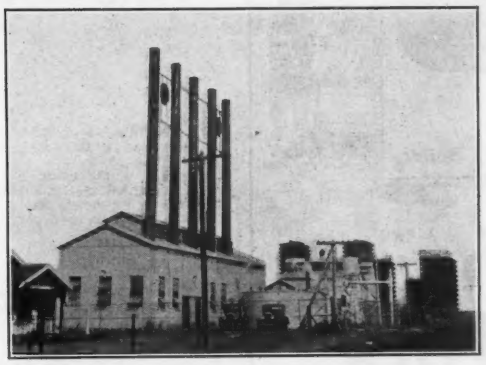
FILLING STATIONS THAT PAY DIVIDENDS
Attractive in appearance and of sturdy construction, these STEFCO Steel filling stations are the equivalent in the utility and earning power of buildings costing ten times as much.

STEFCO BUILDINGS ARE GOOD BUILDINGS, AND STEFCO SERVICE IS JUST AS GOOD

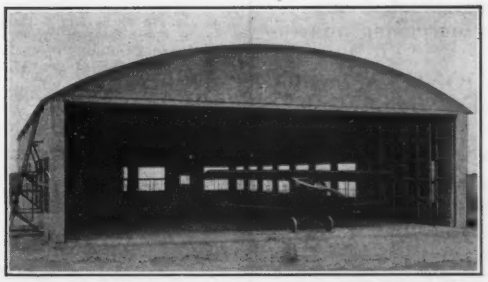
This combination of a good product and an exceptional service explains the popularity of STEFCO buildings with the oil industry. All great industries must have dependable sources of supply in every line and particularly is this true with the fire alarm moving oil industry, where the supply source must be quick and sure.

QUICK UTILITY OF STEFCO BUILDINGS

Designed on the sectional principle and 85% shop assembled, the quick utility of STEFCO buildings from production to field erection is outstanding. STEFCO manufactures but one product, devotes 175,000 square feet of floor space to the production of STEFCO buildings and carries a half million dollar stock to meet quick demands for which its reputation is undisputed. Assembled in the largest sections practical for car shipment and field handling, STEFCO buildings are easiest to erect, easiest to expand and quickest to salvage.



STEFCO MONITOR TYPE BOILER HOUSE
This 24'x80'x18' STEFCO building houses five boilers. The STEFCO monitor type is particularly suitable for boiler house use, providing both light and ample ventilation.



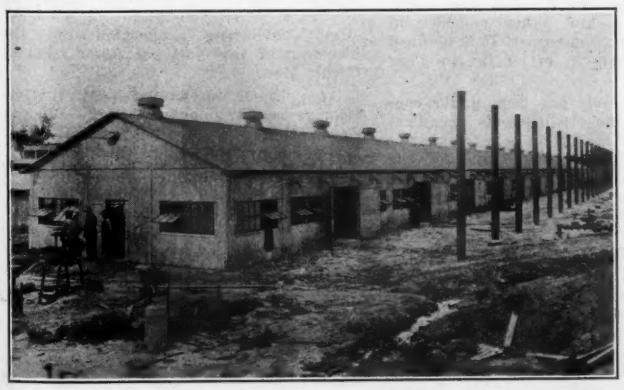
A NEW USE FOR AN OLD PRODUCT
STEFCO buildings are showing the same popular demand in the aero field that they have enjoyed for years with industry in general. This 56'x100'x16' STEFCO building is a combination Hangar and Airplane Manufacturing Plant.

STEFCO BUILDINGS ARE WEATHER TIGHT

The all important weather flashing of steel buildings has been uniquely worked out by STEFCO. The section junctions, the eave line, the rake and the ridge are all efficiently flashed by designs found in no other corrugated building and protected by STEFCO patents.

CONSULTING ENGINEER SERVICE WITHOUT OBLIGATION

In the major oil fields, competent engineering service is almost as close to you as your telephone. Consult any of the following offices on your building requirements and let them show you what a real building and complete erection service mean.



(At Left)
A 30'x380'x10' STEFCO COMPRESSOR BUILDING
At an erected cost of less than $1.00 per square foot of floor space, this STEFCO building houses $250,000.00 worth of machinery with full protection from the elements.

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TWO 20'x96'x8' STEFCO GARAGES
With full protection against such destructive agencies, as fire and lightning, these STEFCO garages each provide space for twelve cars at a decided cost saving over masonry construction.

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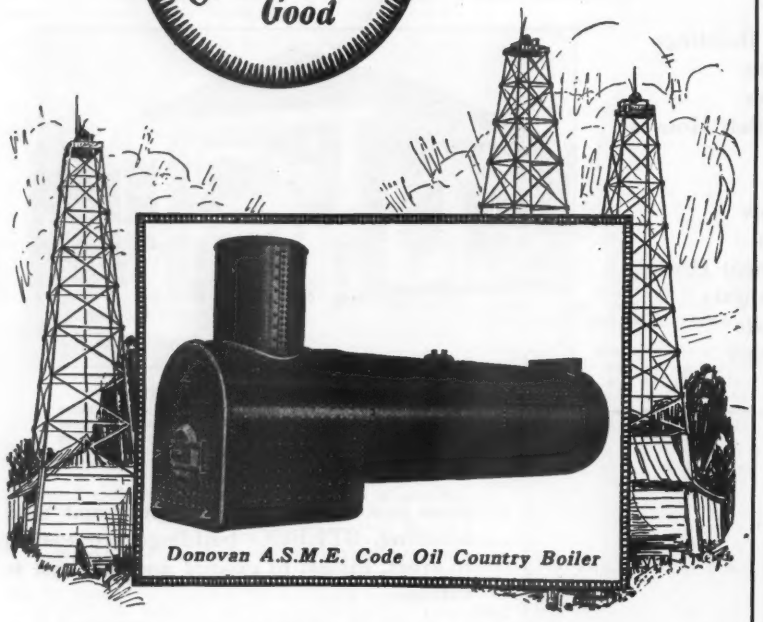
Donovan Boilers are Consistently Good



Donovan A.S.M.E. Code Oil Country Boiler

The First Choice For Hard Work

Maintenance and operating expenses are a factor of great importance, particularly in foreign fields. Far from the base of supplies, a breakdown is more serious than usual. Consequently, DONOVANS are being chosen in increasing numbers for such difficult tasks.

On a wild cat well in South America, a DONOVAN and another boiler of the same size were operating side by side under exactly the same conditions.

The driller told us that the DONOVAN used far less fuel, steamed much easier and demanded less attention than the other boiler. The deeper the drilling, the more pronounced the DONOVAN'S superiority became and it was called upon for increasing amount of work.

Practical men prefer DONOVANS. They have no use for a slacker. They want real "he boilers" that are not afraid of hard work and do not have to be coaxed.

If you are not already a user of DONOVANS, it will certainly pay you to try them.

Manufactured by

DONOVAN BOILER WORKS, INC.

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Mid-Continent and Eastern Distributors
GREAT NORTHERN TOOL & SUPPLY CO.
MIDLAND IRON WORKS
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All Leading Supply Houses Throughout the Eastern Fields Handle

DONOVAN QUALITY PRODUCTS

NONE BETTER

Continental Oil Co.'s No. 2 Sealey, 330 ft. S and W, Sec. 81, Blk. A, G.M.M.M.&A. Sur. ..... Top brown lime 2,280 ft.; cem 8-in. casing 2,284 ft.; total depth 3,245 ft.; oil pay 3,135 ft.; second oil pay 3,210-15 ft.; increase 3,230 ft.

Gulf Prod. Co.'s No. 2 Hutchins, 330 ft. N and E, Sec. 7, Blk. O ..... Top salt 1,240 ft.; top pay 2,52[illegible] ft.; fishing 3,200 ft; flowed 160 bbls.

Gulf Prod. Co.'s No. 6 O'Brien, 2,310 ft. from N, 330 ft. from E, Sec. 20, Blk. F, G.M.M.B.&A. Sur. ..... Top salt 1,076 ft.; 40,000,000 ft gas; show oil 2,625-30 ft.; produced 200 bbls. 21 hrs.; coring 2,808 ft.

Gulf Prod. Co.'s No. 3 Wristen Bros., 220 ft. NE of SW and 220 ft. SE of NW Sec. 18, Blk. 5, H.&T.C. ..... Show gas 1,960-70 ft.; drlg. 3,040 ft.

L. C. Harrison et al's No. 1 Wristen, 990 ft. from S and W lines of Sec. 26, Blk. B-28 ..... Shut down 150 ft.

J. H. L. Oil Co.'s No. 3 Hayzlett, 220 ft. N and W Sec. 17, Blk. 5, H.&T.C. ..... Rigging up.

E. B. Lovelace et al's No. 1 Redman, 1,980 ft. NE of SW line and 1,980 ft. SE of NW line, Sec. 162, Blk. 24, H.&T.C.R.R. ..... Drlg. 850 ft.

Penn & Atlantic's No. 1 Pecos Mercantile Co., Sec. 16, Blk. 34 ..... Shut down 2,587 ft.; salt water and oil 2,584-87 ft.

Shell Pet. Corp.'s No. 1 Owen et al, 220 ft. NW of SE line, 220 ft. SW of NE line, Sec. 16, Blk. 5, H.&T.C... Top salt 775 ft.; cementing 10-in. casing 782 ft.

Shipley's No. 3 Hayzlett, 2,490 ft. S, 1,470 ft. W Sec. 17, Blk. 5 ..... Moving material.

Shipley et al's No. 1 Monroe, 330 ft. SE SW, Sec. 3, Blk. 1 ..... Shut down 517 ft. for casing.

WINKLER COUNTY

Atlantic Oil Prod. Co.'s No. 6 Hendricks, 330 ft. S, 2,310 ft. W of NE cor., Sec. 44, Blk. 26, School Land ..... Cementing 6⅝-in. casing 2,730 ft. total depth 2,899 ft.; flowing 351 bbls. daily.

American Maracaibo Co.'s No. 2 Hendricks-B, 1,980 ft. N and 1,650 ft. E of SW cor., Sec. 28, Blk. B-5 .... Top lime 2,599 ft.; top pay 2,731 ft.; 2,000 ft. oil; increase 2,875 ft.; show water 2,928-31 ft.; shot 140 qts. 2,715-40 ft.; cleaning out; 2,000 ft. oil in hole; shot again 40 qts. 2,715-40 ft.; no results 800 ft.; oil in hole: T. D. 3,416 ft.; 50-bbl. well; cleaning out water, shut off.

V. T. Bolin's No. 2 Brown et al, 2,000 ft. S and W of NE, Sec. 4, Blk. B-5, Public School Land ..... Top salt 1,300 ft.; coring 2,547 ft.; shut down 8-in. casing.

Cinderella Syndicate's No. 1 Hendricks, 330 ft. N, 1,650 ft. W Sec. 42, Blk. 26, Public School Land .... Spudded.

Cranfill & Pickrell's No. 2 Hutchins, 2,310 ft. S and W Sec. 47, Blk. 26 ..... T. D. 2,727 ft.; running 6-in. 2,722 ft., gray lime; show gas 2,280 ft.; increase 2,395 ft.; estimated 5,000,000 ft. gas; rigging up standard.

Gulf Prod. Co.'s No. 2-B Lum Daugherty, 2,310 ft. from N and 1,320 ft. W, Sec. 22, Blk. 26, P.S.L. ..... Top lime 2,495 ft.; show oil 2,686-85 ft.; pay 2,698-2,700 ft.; flow 50 bbls. hourly 88% water; shut down 3,005 ft., orders.

Humble O. & R. Co.'s No. 1-D Hendricks, 330 ft. from S, 2,310 ft. from W of Sec. 41, Blk. 26 ..... Fishing 1,896 ft.

Liner Drlg. Co.'s No. 1 Campbell, 330 ft. from N and E cor., Sec. 2, Blk. B-5 ..... Shut down 2,235 ft.

Shell-Llano Oil Co.'s No. 7 Scarborough, 1,020 ft. from N and W, Sec. 2, Blk. 77 ..... Total depth 3,371 ft.; made 78 bbls. 6 hrs. from pay 3,942-62 ft.

Skelly Oil Co.'s No. 5 Daugherty, 1,326 ft. W, 2,310 ft. S, Sec. 22, Blk. 26 ..... Location.

Southern Crude O. P. Co.'s No. 4 Hendricks T-90, 2,310 ft. S and E of Sec. 47, Blk. 26 ..... Top lime 2,242 ft.; drlg. 2,531 ft.; 18,000,000 ft. gas 3,401-04 ft.; mixing mud to kill gas; estimated 25,000,000 ft. gas; oil show 2,575-78 ft.

Brown Elected Head Of Refinery Credit Men for Coming Year

Refinery credit men at the annual conference of the Petroleum Refiners Division of the National Association of Credit Men at Tulsa, October 3 and 4 perfected plans for a comprehensive telegraph code for use in connection with the Interchange Bureau and other confidential contacts between companies. It is planned to have the code in effect in the near future.

A telegraph code has been under consideration by the credit men's organization for some time. It is believed that it will greatly facilitate the work of the members who have successfully carried out practically all the other phases of their organization for the interchange of credit information.

W. T. Brown, credit manager of the Producers and Refiners Corp., Independence, Kans., was elected chairman of the Petroleum Refiners Division for the coming year. He succeeds W. A. Ryan, credit manager of the Mid-Continent Petroleum Corp., Tulsa, who presided at the Tulsa conference. In addition to Mr. Brown the following were elected to the board of governors: C. E. Votrian, Barnsdall Refineries, Inc.; F. E. Brown, Louisiana Oil Refining Co., Shreveport; G. C. Goller, Lubrite Refining Co., St. Louis; K. R. Hankinson, Tide Water Oil Co., New York; R. R. Cox, Kanotex Refining Co., Arkansas City, Kans., and Mr. Ryan.

The two-day conference was devoted to the presentation of prepared papers on subjects of direct concern to the credit operations of refining companies. These papers were followed by forum discussions.

Mr. Ryan in the opening address stated that the refinery division had shown a steady growth during the past year both in membership and scope of work. The work centers in the Exchange Bureau, which has offices in Tulsa and acts as a clearing house for the membership. The bureau is operated under the direction of the National Association of Credit Men.

At a dinner on October 3, M. E. Garrison, executive manager of the Wichita Association of Credit Men, Wichita, Kans., addressed the members. W. J. Vaught of the First National Bank of Tulsa also spoke at the dinner. Guy E. Truex, a director of the national association, attended the conference.

C. R. Olson, sales promotion manager of the Mid-Continent Petroleum Corp., Tulsa, in an address on "The Sales Manager Looks at the Credit Department," stressed the fact that the credit department of a company was a vital factor in its sales program. He cited instances in which credit departments by constructive co-operation had been able to materially aid the sales departments in their work.

PHILLIPS BUYS STATIONS

The Phillips Petroleum Co. of Bartlesville, Okla., has purchased a chain of 10 retail stations at Denver, Colo., owned by the Morrison Brothers.

Analysis of Santa Fe Springs Field

May Be Producing 200,000 Bbls. per Day Six Months Hence. Need for Conserving Gas Most Important Factor

By Joseph Jensen, McDowell Graves, W. D. Goold and M. L. Gwin
Petroleum Engineering Department, Associated Oil Co.*

During the present year the Santa Fe Springs Field has proven to be the most important oil field under development in the United States. Its production will exceed that of any other field. Without it, production within the United States would have been almost in even balance with consumption. The field has forced to the fore and compelled, more than any other single factor, serious consideration of the need of conserving the gas resources of the State of California. It has also contributed much to the development of new drilling equipment and important features in petroleum engineering and has required the development of a new cement for use in deep wells because of high temperatures. It is the only oil field in the country where wells 8,000 feet deep have become so common that they are no longer given special attention.

The field covers a little less than 1,400 acres of land. In it 196 producing deep zone wells have already been drilled since August, 1928, and 224 wells are still drilling. More wells may be drilled. This indicates that probably more than 450 wells will be drilled in the present campaign. In hardly a year's time it has caused the outlay of nearly $50,000,000 for drilling and within the year 1929 it will have returned practically an equal amount of revenue.

In contrast to conditions during 1923, when this field was once before an important and disturbing factor, the California oil industry has not been forced to refinance to meet the situation presented by such a large production of oil. Unlike in 1923, there has been practically no unit selling, no stock selling nor any unnecessary development far beyond the limits of the field.

Production is now about 275,000 bbls. per day and gives every promise of remaining at this figure or increasing to nearly 300,000 bbls. Six months from now the field should still be capable of producing in excess of 200,000 bbls. per day. Obviously, the need for conserving gas that would be blown to the air, incident to the production of so large a volume of oil, represents a problem in conservation deserving of the most serious attention of the oil industry and of the State of California.

Changes in Equipment

Changes in equipment are the most noticeable feature that attracts the visitor in the field. The derrick has now been increased in height to 136 feet with a base 26 by 26 feet. All parts in it have been increased in size. Crown blocks, traveling blocks and rotary engines all have roller bearings where formerly plain bearings were used.

Mud pumps are now equipped with steel ends capable of withstanding a pressure of 3,000 pounds per square inch. In order to maintain circulation, the various sizes of drill pipe call for circulating pressures as follows:

8-inch	250 pounds
6-inch	400 to 600 pounds
4-inch	700 to 800 pounds
2 to 3-inch	900 to 1,200 pounds

To start circulation or to cement necessitates an initial pressure of over 1,500 pounds. The wire wrapped rubber mud hose has given way to a steel mud hose consisting of lengths of steel pipes and adjustable, flexible joints.

Upset drill pipe is being used more than formerly. Special heat treated steel drill pipe has been introduced. Long strings of drill pipe now use a safety or releasing joint about 40 feet above the drill collar. Boilers delivering steam at pressures of 200 pounds have been introduced within the past 10 months, in contrast to 70 and 100-pound boilers used in 1923. The building of this heavier equipment has been necessary to reach the greater depths and also to save time in coming out of the hole.

The fishtail bit, so popular a few years ago, has been partly replaced by new types. All of these bits use hard facing material so that it is possible to drill with the bit for as much as one or two days without coming out to change. Thus, it is that wells drilling between 4,000 and 5,000 feet have made as much as 255 feet per day and wells drilling between 7,000 and 8,000 feet have made as much as 135 feet per day.

The casing program used in this field was developed more than two years ago in the Ventura Avenue Field and has proved adequate for reaching all depths. Twenty-inch stove pipe at 1,000 feet is cemented as a conductor string, and 13⅜-inch casing is cemented at about 4,100 feet at the first water string on top of the Meyer zone. Strings of lesser size are carried down to the lower zones. Some wells now drilling for the Clarke zone expect to set 9-inch casing at depths near 8,000 feet. This promises to be possible from a mechanical viewpoint where shutoffs at lesser depths over other oil zones are not made.

Drilling Time

The improvement in drilling time that has been made possible is shown by the records of Associated Oil Co. wells drilled in 1923, 1926, 1928 and 1929. Summarized, this shows:

Year	Depth	Zone	Days	Average feet per day	Well
1923	4,741	Meyer	115	41.22	Green No. 2
1926	4,600	Meyer	77	59.74	Dewenter No. 5
1928	5,780	Buckbee	108	53.44	Green No. 3
1929	6,826	O'Connell	111	61.49	Dewenter No. 8

Before the campaign is over in 1929 it is expected that 8,000-foot wells will be drilled in less than six months' time.

Oil-Bearing Formations

Oil-bearing formation has been encountered in the central part of this field almost continuously from 3,500 feet to nearly 8,000 feet. Around the edges of the field and approaching very close to its crest are prominent edgewaters. They have created particularly difficult problems in petroleum engineering in locating water shutoffs and have compelled the use of many strings of pipe for supplementary shutoffs to protect the oil zones above the one from which production is being secured. However, the top zone has had no protecting string set above. It has been amply protected by cement and rotary mud. Owing to this fact, the many bodies of productive oil formation limited by intervening edgewaters have been named for convenient identification. The names of the various zones, the depth to which the water shutoff above them is made near the center of the field, and their thickness on top of the structure are as follows:

Zone—	Depth shut-off	Productive thickness
Foix	3,500	50–100
Bell	3,675	100–250
Meyer	4,050	600
Nordstrum	4,900	75–200
Buckbee	5,600	120–300
O'Connell	6,300	400–700
Clarke	7,350	500– ?

The identification of the zones above the O'Connell zone is now well established by drilling, but designations relative to the Clarke zone are not so definite. Associated Oil Co.'s No. 2 Clarke was one of the few wells deepened from the Meyer zone for the purpose of prospecting outlying territory. The first oil sand it encountered at great depth was originally called the Upper or First Clarke. Eventually this proved to be part of the Lower O'Connell zone. The second oil sand encountered by it was called the Second or Lower Clarke. The third oil sand encountered by it has been called the Third Clarke or the Hathaway. In this discussion, the Second Clarke and the Third Clarke are combined under the name of the Clarke zone since they have now been proven continuous on top of the structure and, like each of the other zones, it derives its name from the well in which oil was first commercially produced.

Deeper Possibilities

Beneath all of these zones there is still the possibility of additional oil-bearing formation. An excellent shale body more than 100 feet thick, as shown on the cross section as the Fulton shale, has been cored. While water appears to have been encountered beneath this shale in the Fulton wells, it is still possible for a zone of the extent of the Bell or the Buckbee zone to exist on top of the structure. If later found, it would merely be a continuation of the Clarke zone, as this has not yet been fully penetrated on top of the structure.

Just when prospecting and deep drilling will stop is difficult to forecast. The Meyer zone in 1923 was extensive enough to furnish production for nearly all wells drilled. The Clarke zone gives every promise of being equally extensive. Consequently, the Clarke zone may represent a convenient stopping place for all wells now drilling. Many of these wells are being finished up with 4¾-inch water shutoffs so that they can not be carried deeper. It is therefore anticipated that the Clarke zone will prove to be the termination of the present Santa Fe Springs drilling campaign.

There appears to be no limit either to human curiosity or to the depth to which wells can be drilled, so this statement is not to be taken as a promise of what may eventually follow in the Santa Fe Springs Field. Formations thus far identified are Pliocene and Miocene. An appreciable thickness of Miocene formation has been proven productive successively in the Richfield, Huntington Beach townsite, Long Beach and Seal Beach Fields.

A portion, if not all, of the Clarke zone is in the Miocene. While the geology does not justify the expectation of additional oil sands (other than some reasonable extension below the Fulton shale), as the Miocene has not been fully tested by deep drilling in the above named fields, the future of deeper drilling at Santa Fe Springs will be much the same as that in these other fields.

The Nordstrum, Buckbee and O'Connell zones were developed from the center toward the edge of the field. Development of the Clarke zone is proceeding in the opposite way. It will therefore be more rapid, so that this factor will tend to balance the time taken in drilling such deep wells.

Fortunately, the shale bodies overlying the oil zones have been so persistent throughout the field that the selection of proper cementing points has been remarkably uniform, in spite of crooked holes that are so prevalent because of the depths being drilled. Continuous coring for as much as 3,000 feet in outlying wells has been necessary. Practically all wells have cored several hundred feet of formation even in the center of the field.

Cementing Problem Solved

Such problems were solved with relative ease, but following the discovery of the Clarke zone a new difficulty presented itself. Ordinary cements failed to give successful water shutoffs with the same degree of success as in the shallower zones. Practically no wells in the shallower zones were held up on account of faulty water shutoffs or difficulties of this kind. For a time the cause of the trouble with the Clarke zone shutoffs was not known, but a test to determine the temperatures of wells proved that temperatures of 200 and 212 degrees Fahrenheit were encountered. After these temperatures were discovered, laboratory tests proved that most cements, when mixed and allowed to set at such temperatures, failed to show any uniformity or regularity in performance. The Pacific Portland Cement Co. met and successfully solved this problem by manufacturing a new high temperature cement, designed to set and give a maximum strength at these high temperatures. The cement has now been in use for about two months and gives every promise of eliminating further difficulty.

The problem of satisfactorily locating water in an uncased hole gives promise of now being solved. In several wells fully 8,000 feet deep and having from 200 to 400 feet of open hole, it has been possible to introduce an electrolyte through tubing, or drill pipe. The tubing is then pulled up inside the water string or the drill pipe is removed, and electrodes are run through the tubing or the water string. Fluid is bailed in sufficient amount to cause the salt water to enter the hole. It dilutes the electrolyte so that the voltmeter readings are greatly reduced. While the use of electrolytes in locating water is not entirely new, the locating of water in uncased holes has heretofore been impossible except by plugging in stages.

Data on Zones

Data as to each zone at the present time is as follows:

Zone—	Total wells produced from zone at time of peak prod.	Past producers	Present producers	Production of Sept. 24, 1929
Meyer	296	79	*217	*26,238
Nordstrum	40	19	21	13,836
Buckbee	100	59	41	22,330
O'Connell	128	29	99	130,934
Clarke	36	1	35	80,366

*Includes some Foix and Bell zone wells.

The many producers that have been abandoned in the Buckbee zone to produce from the O'Connell zone indicate that a similar number of wells will be abandoned in the O'Connell zone within the next few months to secure production from the Clarke zone. The abandonment of most of these wells has been forced by the invasion of edgewater which practically killed the production of oil and gas. This invasion of edgewater in the O'Connell zone has begun, as evidenced by the score of former O'Connell zone producers. The O'Connell zone has ceased to be the objective for which most of the wells in the field are now being drilled. Of the 224 active drilling wells, at least

*Before Petroleum Division, American Institute of Mining and Metallurgical Engineers, Los Angeles, Calif., October 4. Published by permission of the A.I.M.E.

150 are known to be planned as Clarke zone wells. The remaining 74 wells may produce from the O'Connell zone for a time, but a portion of them will be carried into the Clarke zone.

The loci of the crest of the zone structures lie within a belt about 500 feet wide. The crests of the Buckbee and O'Connell zones seem to be fairly vertically superimposed over the crest of each underlying zone. The crest of the Meyer zone is distinctly south of the crests of the underlying zone structures and is also much sharper. The closure on the Meyer zone is 50 to 100 feet more than the closure on each of the underlying zones. This additional closure resulted in the top of the Meyer zone being shoved south, as compared with the underlying zones.

Pool Becomes Unit

After each zone has definitely passed its peak of production, the decline in initial production and daily production parallel each other very remarkably. It is surprising that the initial production of the new wells is not much larger than the average production of the wells in the zone. This rather tends to indicate that where zones are drilled simultaneously, such as is now common in a field of many ownerships, the oil pool becomes very much of a unit from which production is taken fairly uniformly by all producing wells. This indicates that after a zone has been drilled up, there is little to be gained by hastening the recovery of oil and gas beyond the market needs of the community being served. The advantage of securing the flush production is largely gained in the early life of the zone, but once the zone is drilled up, this advantage disappears very rapidly. Prudent conservation of resources, therefore, justifies retaining the gas in the ground with the oil until the gas can be used by the community rather than permitting the same to be blown into the air.

The impression is so widespread that Santa Fe Springs is essentially a townlot field that it is worth while to call attention to the fact that the abandonment of wells in one zone to permit their use in the development of a deeper zone has resulted in the acreage per producing well being practically as satisfactory as that in fields of larger ownership than the townlot area of Santa Fe Springs. Unquestionably, in these zones there is still much oil to be recovered that will be recovered during 1930. These zones will again be developed by drilling. This was the experience had in 1924, following the exploitation of the Meyer zone. In August, 1923, the number of Bell zone producers was reduced to 26; by October of 1924 it had increased to 79.

Production curves bring out the fact that the increase in the average daily production per well is very rapid until a peak is reached. This is followed by a sustained average and then a less abrupt decline, until the production of the well falls to between 1,000 and 500 bbls. per day. Thereafter the decline is very gradual. Meyer zone wells declined until they averaged less than 200 bbls. per day. That was before the day of the gas lift. It is highly probable that the gas lift will maintain the average production of the wells in the different zones at somewhere between 300 and 500 bbls. per day.

Peaks of Zones

The various zones had peak productions as follows:

Zone—	Date	Peak prod. Bbls. per day
Nordstrum	Jan. 22, 1929	63,647
Buckbee	Feb. 26, 1929	122,325
O'Connell	July 16, 1929	220,592

It is surprising that the peak production of the field failed to coincide with peak production from any of these zones. The peak production of the field was established on August 13 at 309,338 bbls. This peak was due to new flush production secured from the Clarke zone after the O'Connell zone had passed its peak. Each of these zone curves has a rather flat top, followed by an abrupt drop.

The Foix, Bell, Meyer, Nordstrom and Buckbee zones have reached what may be termed fairly settled production. The O'Connell zone may be expected to continue its rapid decline until a production of less than 100,000 bbls. is had, but by the time it reaches 50,000 to 60,000 bbls. its production should be settled. By the end of the present year these various sources of production will, therefore, contribute the following amounts of oil:

	Bbls.
Upper zones	25,000
Nordstrom zone	10,000
Buckbee zone	20,000
O'Connell zone	50,000
Total	105,000

An examination of the trend of the total daily production of the Clarke zone indicates that it is rising almost as steeply as the curve of flush production of the other zones rose earlier in the year. By the end of the year it might rise to 100,000 or 150,000 bbls. per day. Hence the production of this field could easily amount to 200,000 and might possibly be above 250,000 bbls. at the end of the year.

The production of the field in gas and oil during the present year in monthly totals and daily average is tabulated below. The gas-oil ratio for the field is also given.

OIL-GAS RATIO OF SANTA FE SPRINGS

Month—	Total oil	Daily aver. oil	Total gas*	Gas-oil ratio
January	4,759,671	153,538	9,524,469	2,001
February	5,300,380	189,299	12,673,731	2,391
March	5,275,300	170,171	13,813,468	2,618
April	4,749,940	158,331	10,261,794	2,160
May	5,629,580	181,600	10,110,604	1,795
June	7,123,985	237,466	13,360,911	1,875
July	8,134,848	262,405	18,671,698	2,295
August	8,726,533	281,501	20,872,201	2,391

*All gas quantities in thousands of cubic feet.

Nearly three-fourths of the gas now being produced is blown into the air. The need of the conserving it has been appreciated by the State of California. An injunction has been sought so that it may be conserved for beneficial use. As the field still has a long life ahead and the gas can assist in recovering additional oil from the Meyer zone, as well as the deep zones, a conserving of gas will probably result in an added oil recovery from the field.

PETROLEUM ENGINEERS CONSIDER UNIT CONTROL

(Continued from Page 56)

so that it would be one-quarter of what it now is to produce the barrel of oil.

By using such a method the Humble Oil & Refining Co. had found it possible to reduce its supply of stored oil from 23,000,000 bbls. to about 10,000,000 bbls., which means a huge saving in interest charges upon the money used in purchasing and producing this oil and this money so saved can go to other channels and be used for more beneficial purposes.

"It is not a problem that this country can consider as affecting it alone," Mr. Farish declared, "for at this time practically every foreign oil-producing country is operating under some sort of unit control basis. The conditions in these foreign countries where concessions to one or two large companies give them the control of the situation or where the government itself deals with the oil problems direct is such that the United States oil companies will suffer materially if they do not quickly realize that they must come to some understanding if they are to meet this type of competition.

"In Venezuela there are but three major companies producing the bulk of this oil and by lowering of costs through eliminating competitive operating conditions this oil is being produced at about $0.30 per barrel and it is being shipped abroad from Venezuela to this country and to meet United States oil in competition in other countries and this condition is not beneficial to the producing companies and refineries here.

"In Russia the government controls all oil production as well as every other phase of the industry with the result that it will supply its own growing demands for the finished products and gradually be able to enter the European markets and the Far East with these products in competition with the other oil-producing areas of the world.

"Rumania, while small in the way of total production, is fully controlled by agreement among the operating companies and agreement with the government.

"Persia is practically operating under a one-company control, while in the East Indies and Far East the Dutch-Shell and Standard Oil Companies have the concessions and work in a close agreement. Irak is likewise controlled and operated by one company and in the South American countries of Colombia and Peru the control rests with the government largely although the large operating companies do not enter into competition to the extent that they destroy their efficiency. This is also true in Argentine where the government controls all oil operations.

Will Benefit All

"This condition that exists in foreign fields where over 80 per cent of all the future oil reserves are located, is going to force some action on the part of the operators here and such protective measures will not only benefit them and permit them to earn a justifiable profit upon their invested capital, a condition that is guaranteed the railroads of this country by the Government, but will react to the benefit of the original owner of the land and everyone else concerned.

"The small producer, if he hopes to grow and be prosperous, should be among the first to join in a movement to control production, and one of the quickest means of his securing the desired results is to co-operate with the others in the application of unit control to his properties."

Mr. Farish made the statement that he would rather have 50 acres of unit controlled and operated production than 100 acres of competitive production.

"The means of bringing about this condition," he said, "are available at this time if the industry will only avail themselves of them. It should start with a pooling of acreage under an agreement to control drilling and this should be done when this acreage is first secured, and before any wells or development has been done upon it. In accordance with the opinion of attorneys such a procedure is within the law in the State of Texas and several of the larger operating companies have made it a practice for some time to refuse to buy acreage in prospective pools where this kind of an agreement does not exist.

"This is a perfectly logical method of procedure for the industry, for in buying the surface rights it is well known that the petroleum underground is still to be secured and if the old competitive method of production and drilling is to be followed it has been shown that everyone pays much more for the crude oil than they would have been required to pay if the development of the pool had been in an orderly manner."

Progressive unit control can be applied to those areas where the pooling agreement for a drilling program has not been made, and even if only 60 or 75 per cent of the lease owners agree upon the production program it has been shown that it is most beneficial, and as this knowledge becomes more generally known others are going to follow this method of operation with a resulting lowering of costs, as Mr. Farish has already found to be secured by his company and others."

Unnecessary to Wait for Law

"To wait for some legal steps to be taken to make unit operation effective is futile," Mr. Farish thought, "for at the very best it would take four or five years to work out all the problems involved and then some additional time to put the government machinery into operation, and the industry should realize that such delay is dangerous, when the trend of conditions in the other oil-producing countries is considered, especially when it is realized that they control such a huge majority of the potential oil reserves of the world.

"If the majority of those interested in the industry proceed to do those things which they now know can be done legally and with good engineering practice it will not be a great while before the benefits will be realized and success is something that quickly gains favor and the smaller operators and others, who now seem to feel that their interests are jeopardized if they do not get their oil out of the ground at once regardless of all other consequences, will be willing to join and this program of conservation can be made practically 100 per cent effective.

"So long, however, as the majority of the industry is going to hold back and refuse to do what they know at heart is necessary to promote their own best interests just because two or three individuals in an oil pool can upset a well-planned drilling program little progress will be made, but by setting the example of good production practices, as many of the major companies are now doing it should not be long before the small minority are willing to join in the pooling agreement and reap their share of the benefits to be secured."

This talk by Mr. Farish had much to do with the crystallizing of sentiment at this meeting and placing upon the engineer the burden of showing to the industry and to the country as a whole the need for the use of sound engineering principles in the production of oil more than has heretofore been followed.

Engineers Should Advise

All of the major producing companies have engineering staffs and the advice of these engineers is valued and sought by the executives of the companies, but it has been the usual practice to use the skill of the engineer for the immediate gains of the particular company for whom he is working rather than utilize this skill for the benefit of the industry and the individual units secure their share of these benefits out of the general progress made.

The meeting was largely devoted to the discussion of well spacing as one of the major problems of unit control or operation and many very valuable ideas were advanced in the papers and in the open discussion on the floor. This is one of the best means of the oil industry securing the benefits of the engineers' skill, for an exchange of ideas is in a sense a means of education and this is an opportunity welcomed by every engineer who is worthy of the name.

The two-day session of the engineers was broken by a buffet dinner and smoker held in the rooms of the Tulsa Club on Thursday at which Pres. E. B. Reeser of the American Petroleum Institute spoke. His address is given elsewhere in this issue of The Oil and Gas Journal and offers a lot of food for thought for the engineer who is desirous of keeping in touch with the trend of things that have to do with his profession and the industry.

It was most gratifying to the sponsors of this meeting to note the unusual amount of interest shown by the executives and the men from the ranks for the attendance was at all times large. Over 175 engineers registered for the two meetings and delegates were here from several European countries and South America as well as from every part of the United States where oil is produced.

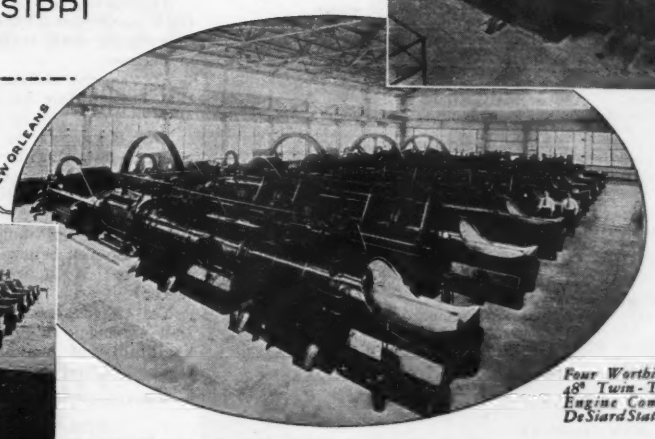
This meeting was followed on Monday and Tuesday of this week by a two-day session by the Division of Development and Production Engineering of the American Petroleum Institute which was held in the new auditorium at the International Petroleum Exposition and here again the men who direct the work of the industry met with the field men who actually perform the tasks requiring physical strength and mechanical skill, with the engineers again playing the role of interpreter and guiding the efforts of all into channels that should be productive of the best results for all concerned.

NOT TO MOVE DEXTER PLANT

The Helium Co. states that the helium plant at Dexter, Kans., is not to be dismantled and moved to Thatcher, Colo. Both plants are owned and operated by the Helium company, the Dexter plant being retained and a new one nearing completion in Thatcher. Both will be operated.

Visit the Worthington Exhibit in Block L, north of the center of the Oklahoma Building

Four of the six Worthington 22" x 36" Twin-Tandem Gas Engine Compressors at Scotland Station. 6000 h. p.



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19,300 Worthington Horsepower

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As the oldest gas engine builder in the United States, with an installed horsepower of 370,154, Worthington possesses a background of experience that is reflected in every engine produced.

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Write for a copy of Bulletin S-550-B1. It contains illustrations, sectional views and detailed description of Worthington Gas Engine Compressors.

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WORTHINGTON

WILDCAT OPERATIONS IN SOUTHWEST TEXAS

(Continued from Page 73)

GONZALES COUNTY

Acme Royalty & Leasing Co.'s No. 1 Weber, Thomas Wright Survey ..... Spudded in.
Adams & Lyles' No. 1 Jackson Sur. ..... Drlg. 800 ft.
Joe Bruner's No. 1 R. D. and J. C. Miller ..... Shut down 3,000 ft.
Crown Petroleum Co.'s No. 1 Hattenback ..... Drlg. 2,545 ft.
Finnell & Elam's No. 1 Robinson, Liverpool Sur. ..... Fishing 1,546 ft.
Hoffman et al's No. 1 Booker, J. Stewart Sur. ..... Shut down 500 ft.
Marshall & Moore's No. 1 St. Clair, R. H. Wynn Sur. .... Drlg. 1,700 ft.; steel derrick up.
L. L. Jones' No. 1 J. F. Kindred, W. W. Barnes Sur., 700 ft. W line, 1,000 ft. S line ..... Location.
Linderman Bros.'s No. 1 F. H. Frampton ..... Drlg. 1,390 ft.
Fort Bend Oil Co.'s No. 1 C. E. Ham ..... 3,300 ft.; out of water.
Frank Sorrell's No. 2 Wilkenson ..... Standing 174 ft.
A. G. Kifer's No. 1 B. B. Dix ..... Shut down 2,680 ft.

GUADALUPE COUNTY

All State Petroleum Co.'s No. 1 Powers, Robert Cartwright Sur. ..... Abandoned 2,204 ft.
J. O. Dore's No. 1 Appling, H. Cottlebur ..... Location.
Grayburg Oil Co.'s No. 1 Wells, Jose La Bume Sur. ..... Reaming black gumbo 373 ft.
Pagenkopf & Kennon's No. 1 Holm, James Kent Sur., 7 miles E of Seguin ..... Rigging up.
Sights' No. 1 Berring Green, DeWitt Sur. ..... Drlg. 2,157 ft.
L. W. Stieren's No. 1 S. H. Herman, Ragsdale Sur. ..... Shut down 1,233 ft.
Sinclair Oil & Gas Co.'s No. 1 Koepp, W. H. Smith Sur. No. 62 ..... Spudded in.
Adams-Lyles-Walton's No. 1 Zoluroski, Jesus Cantu Sur... Corrected depth 953 ft.; standing.

HAYS COUNTY

E. A. Bucklin's No. 1 ..... Set casing 540 ft.

JACKSON COUNTY

Wright Bros.' No. 6 Drushell ..... Waiting orders 2,650 ft.
Wright Bros.' No. 7 Drushell ..... 5,375 ft.; waiting on casing.

JIM HOGG COUNTY

T. J. Conway's No. 2 Palacious, Sur. 232, Blk. 10 ..... Location.
Deep Rock Oil Co.'s No. 1 Kelsey ..... Drlg. 1,350 ft.
R. E. Moore's No. 1 Yaguirre, 150 ft. N & E lines Las Animas Grant ..... Location.

JIM WELLS COUNTY

E. W. Ogden's No. 1 G. Farris, M. Perez Sur. ..... Drlg. 3,040 ft.
Magnolia Pet. Co.'s No. 1 C. Cook, W. H. Sartain Sur., Blk. 45 ..... Drlg. 4,070 ft.

KARNES COUNTY

Benedum-Trees' No. 1 S. E. Crews, Britton Odem Sur. .... Drlg. 1,000 ft.
G. G. Fisher et al's No. 1 Barnett, 6 miles N of Karnes City ..... Drlg. 2,785 ft.
Hurador Oil Co.'s No. 1 W. E. Porter ..... Drlg. 2,516 ft.
The Texas Company's No. 1 Rhuman ..... Set casing 71 ft.

KERR COUNTY

L. R. Page and associates' No. 1 Real ..... Shut down 3,671 ft.

KENDALL COUNTY

E. L. Maddox-Powers' No. 1 Haag, W. Avery Sur. ..... Drlg. 400 ft.

KIMBLE COUNTY

Carl L. Bryant's No. 1 C. E. Lambert ..... Drlg. 150 ft.
H. A. McLean & Jamison's No. 1 R. F. Cannon ..... Shut down 995 ft.
J. B. Lindsay's No. 1 G. C. Anderson ..... Drlg. 785 ft.

KINNEY COUNTY

Lloyd Oil Co.'s No. 1 G. B. Moore, Survey 117 ..... Drlg. 2,200 ft.

LIVE OAK COUNTY

J. P. Lightfoot's No. 1 Lewis ..... Drlg. 1,490 ft.
Dr. Frank Lynch's No. 1 Secrest, Simmons Tracts ..... Drlg. 770 ft.

MAVERICK COUNTY

Ryan Consolidated Petroleum Co.'s No. 2 Indio Ranch .. Shut down 5,300 ft.
Rycade Oil Corp.'s No. 3 Chittim ..... 5,605 ft.; 9,750,000 ft. gas, 20 bbls. oil.
Rycade Oil Corp.'s No. 4 J. M. Chittim ..... Drlg. 5,560 ft.; set casing.
Rycade Oil Corp.'s No. 4 Sullivan ..... Drlg. 5,633 ft.
Rycade Oil Corp.'s No. 5 Chittim ..... Drlg. 735 ft.
The Texas Company, 5 miles west Darling Switch ..... Drlg. 2,650 ft.

MEDINA COUNTY

Pan American Petroleum Co.'s No. 1 Harrison, Sur. 799 .. Rigging up.
Peters et al's No. 1 Noonan, J. N. Alsbury Sur. ..... Shut down 1,250 ft.
R. C. Hill's No. 1 A. Wuezbach, G. Areola Sur., 500 ft. E line, 600 ft. S line ..... Location.
California-Medina's No. 1 Rothe ..... Drlg. 3,442 ft.
A. U. Skogland's No. 1 Soothof, A. Smelzer No. 19 Sur. .. Shut down 900 ft.

MILAM COUNTY

Service Oil & Gas Co.'s No. 1 Muldrow, L. Taylor Sur., SE cor. ..... Location.
E. L. Chapman's No. 2 Johnson, J. J. Acosta Sur. ..... Location.
I. P. Sessions' No. 7 J. Bauer, T. J. Chambers Sur. .... Location.
E. L. Chapman's No. 1 Johnson, J. J. Acosta Sur. ..... Shut down 1,335 ft.
Diggs and others' No. 1 Nolen ..... Derrick.
Hill & Bonwell's No. 1 B. Booher, James Welch Sur. .. Drill stem stuck, 2,007 ft.
Lloyd Oil Corp.'s No. 1 Camp, Acosta Sur. ..... Derrick.
Lloyd Oil Corp.'s No. 1 San Clement, Fakes Sur. ..... Spudded in.
Wilson and others' No. 1 Johnson & Stiles ..... Location; dropped from reports.
J. W. Stiff's No. 1 M. Winston, J. Leal Sur. ..... Location; dropped from reports.
A. H. Wray's No. 1 D. D. Fowler ..... Drlg. 964 ft.

McMULLEN COUNTY

Sun Oil Co.'s No. 1 Berry, J. Poitenent Sur. No. 9 ..... Location.
Natt Holman's No. 1 Shiner, H. M. Brewer Sur. ..... Shut down 2,190 ft.

NUECES COUNTY

Nueces River Basin Dev. Co.'s No. 1 F. C. Allen ..... Fishing 2,990 ft.
R. & G. Corp.'s No. 1 Emily Wright Perkins ..... Standing 3,510 ft.
R. & G. Corp.'s No. 1 Roberts ..... Location; dropped from reports.
Trinity Drillers and Sun Co.'s No. 1 Tompkins ..... Drlg. 2,733 ft.

SAN PATRICIO COUNTY

Magnolia Petroleum Co.'s No. 1 C. Freeman, Sec. 57 .... Drlg. 4,980 ft.
Houston Gulf Gas Co.'s No. 3 Welder ..... Fishing 5,098 ft.

STARR COUNTY

The Texas Company's No. 4-A V. G. Guerra, Porcion 67, Share 305-D ..... Drlg. 500 ft.
Smith & Adams' No. 1 Welch, Pedernal Sur. ..... Drlg. 531 ft.
Ohio Oil Co.'s No. 1 Bass, Porcion 76, Blk. 71 ..... Drilling.
Milam Drlg. Co.'s No. 5 R. Allen, Blk. 147 ..... Location.
U. S. Oil & Gas Co.'s No. 1 Kelsey, Por. 76, Blk. 11 ..... Standing.

WEBB COUNTY

L. U. Nelson's No. 2 Moglio, SE NW Sur. 643 ..... Drlg. 1,300 ft.
Usher Carson's No. 2 D. Benavides, Sur. 1,613 ..... Drlg. 2,520 ft.

WILLIAMSON COUNTY

M. L. Vaughan's No. 1 Logan D. Wright Sur., 300 ft. E line, 500 ft. S line ..... Location.
Ray Oil Co.'s No. 1 W. J. Fouse, W. Donoho Sur. ..... Location.
W. J. Harlan's No. 1 J. V. Stile, J. Bevil Sur., 600 ft. N line, 900 ft. E line ..... Location.
F. M. Moss et al's No. 1 Kreuger, W. Cartwright Sur., SW cor. ..... Location.
J. C. Hawkins, 1½ miles northwest discovery well ..... Location.

WILSON COUNTY

R. M. Sherer's No. 1 Tummilson, A. Trevena Sur. ..... Drlg. 457 ft.
Grayburg Oil Co.'s No. 1 Tigler, Parrot Sur. ..... Drlg. 3,785 ft.
R. M. Sherer's No. 1 First State Bank of Stockdale, Moran Sur. ..... Drlg. 220 ft.

ZAPATA COUNTY

R. F. Blankenship's No. 1 G. T. Montemeyer, Sur. 45, Blk. 7, 150 ft. N & E lines ..... Location.
Buch & Coursey's No. 2 Garza, Blk. 47 ..... Abandoned 932-36 ft.
John Pappas' No. 2 Cuellar, Por. 33 and 34 ..... Drlg. 150 ft.
Hill et al's No. 1 A. O. de Vela, Blk. 36, El Grulle Sur. ..... Drlg. 925 ft.
National Oil Co.'s No. 1 D. B. Adams ..... Standing 690 ft.
Buck & Coursey's No. 1 Trevino, Sur. 1 ..... Drlg. 1,640 ft.

ZAVALA COUNTY

Tritex Oil Co.'s No. 1 Clay Burns ..... Drlg. 730 ft.
Tritex Oil Co.'s No. 4 West ..... Drlg. 795 ft.
Tritex Oil Co.'s No. 1 Childress ..... Drlg. 1,095 ft.

REPRESSURING IN THE MID-CONTINENT FIELD

(Continued from Page 182)

temporary increase. Results depend largely on condition of sand and property, also structural conditions.

In Early Stages

74. What has been your experience in repressuring during early stages of development?

No experience (6). Good results semi-flush production (1). Good results in one case during early stage (3); reduces rate of decline.

75. Do you believe that, theoretically, this is the time to start repressuring? Why?

Yes (9); gas is usually available, tends to retard water encroachment and lowers gas to oil ratio. Conservation of gas. No (1); natural energy within sand should be partially utilized before artificial means are undertaken.

76. Do you believe that it is practical to do so? What would be the limiting factor?

Yes (9); unless pressure for introduction extremely high. Compression costs, availibility of gas and pressure of introduction limiting factors. No (1); best results obtained from settled production.

77. What is your opinion of percentage of unrecoverable oil by normal methods before repressuring is applied?

Sixty to 80 per cent (6); depending on type of sand. No experience (3). Bartlesville sand 70 to 85 per cent, Wilcox sand 40 to 70 per cent, lime 30 to 60 per cent (1).

Projects Reported

78. Tabulated data on properties.

So few answered this in detail, and the projects in some formations are so few, tabulation is made only on projects where a sufficient number are included to give representative values.

Projects reported, by sands, are as follows:

Sand—	Projects	Operation	Abandoned
Bartlesville	21	19	2
Peru	3	3	0
Strays	7	7	0
Glenn	3	2	1
Squirrel	2	2	0
Perryman	1	1	0
Upper Hoover	1	1	0
Cromwell	4	3	1
Burbank	3	1	2
Taneha	1	0	1
Tonkawa	1	1	0
Shawver	1	0	1
Total	48	40	8

Tabulated data, submitted as representative averages, follows:

		Bartlesville 0–1,000′	Bartlesville 1,000–2,000′	Bartlesville Over 2,000′	Strays 0–1,000′	Squirrel Varies
1.	Formation					
2.	Projects included in data	7	7	4	6	2
3.	Age at Repressuring:					
	a. Minimum	6 years	7 years	3 years	1 year	13 years
	b. Maximum	22 years	21 years	16 years	10 years	15 years
	c. Average	14 years	13 years	8 years	6 years	14 years
4.	Age of Repressuring:					
	a. Minimum	2 years	1 year	1 year	1 year	1 year
	b. Maximum	5 years	4 years	1 year	3 years	3 years
	c. Average	3 years	3 years	1 year	2½ years	2 years
5	Average Sand Thickness:					
	a. Minimum	18′	20′	35′	12′	20′
	b. Maximum	39′	70′	77′	35′	25′
	c. Average	28′	45′	56′	23.5′	23′
6.	First Production Increase (Time):					
	a. Minimum	30 days	30 days	120 days	12 days	30 days
	b. Maximum	180 days	90 days	.....	90 days	90 days
	c. Average	70 days	60 days	.....	40 days	60 days
7.	Per Cent Increase (At Max.):					
	a. Minimum	115	13	0	52	398
	b. Maximum	473	238	95	246	900
	c. Average	210	85	..	102	523
8.	Per Cent Increase (At Present):					
	a. Minimum	80	0	0	26	163
	b. Maximum	359	135	95	100	900
	c. Average	146	27	0	91	347
9.	Change in Gravity:					
	a. Minimum	0	0	0	0	0
	b. Maximum	—1	+—1	+1	—2	—1
10.	Producing Wells	1,320	438	86	888	16
11.	Pressure Well Ratio:					
	a. Minimum	6.84	15.0	13.0	9.0	4.0
	b. Maximum	5.38	3.5	6.3	4.8	4.0
	c. Average	6.3	8.5	9.4	8.1	4.0
12.	Pressure:					
	a. Minimum	75	45	75	100	100
	b. Maximum	240	350	250	200	260
	c. Average	125	170	150	145	180
13.	Project Cost per Well:					
	a. Minimum	$129.00	$157.00	...	$192.00	...
	b. Maximum	522.00	943.00	...	640.00	...
	c. Average	252.00	445.00	...	277.00	...
14.	Project Cost per H.P.:					
	a. Minimum	$150.00	$123.00	...	$100.00	...
	b. Maximum	476.00	305.00	...	244.00	...
	c. Average	187.00	232.00	...	212.00	...
15.	H.P. per Well (All Wells):					
	a. Minimum	0.5	0.8	...	1.7	...
	b. Maximum	3.3	6.5	...	3.8	...
	c. Average	1.4	2.5	...	2.3	...
16.	Lifting Cost Change (Present):					
	a. Maximum increase	25.0%	87.5%	...	100.0%	...
	b. Maximum decrease	34.6%	40.6%	...	43.0%	...
17.	Input Volume per Well:					
	a. Minimum	10,000	25,000	70,000	26,000	25,000
	b. Maximum	85,000	90,000	250,000	60,000	50,000
	c. Average	18,000	41,000	161,000	33,000	31,000

Note—All averages are the true mathematical averages, and not project averages.

CONDENSATION EFFECT IN GAS-OIL RATIO

(Continued from Page 101)

content of the trap gases corresponding to the other information, it will be necessary also to assume these as well. The values chosen for these contents are as follows:

	G.P.M. trap gas
Continuous flow	1.5
Interm'ttent flow	2.5

Referring to conversion curve B, Figure 2, as being as good a standard as any readily available, it will be seen that the removal of 1.5 gallons of gasoline from gas having that total content results in leaving 80 per cent residue; 2.5 gallons gas leaves 75 per cent residue. In the following calculation, lines A, B, C and E are taken directly from Mr. Walker's data, or in practice, would be supplied by observation:

Line D = C — B.
Line E = D + A.
Line F is the assumed gasoline content of trap gas. (In practice, actual values should be determined.)
Line G is the corresponding factor from a conversion curve.
Line H = G × C.
Line J = H — B.
Line K = C — H.
Line L = KX (J + H).
Line M = KX(B + H).
Line N = B + M.
Line P = J + L.
Line R = N + P = C.
Line S = P + A = Actual Gas/Oil Ratio.

The figures given in Table 1 are taken direct from Table 1 of Mr. Walker's paper, with the addition of two columns giving the gas-oil ratios computed when

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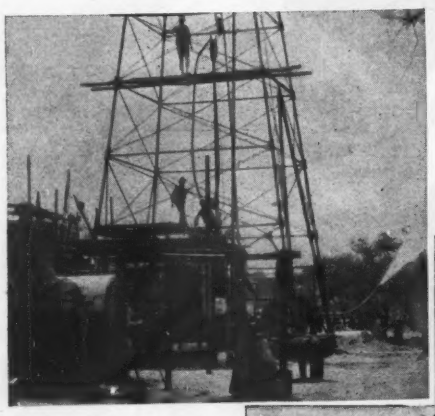
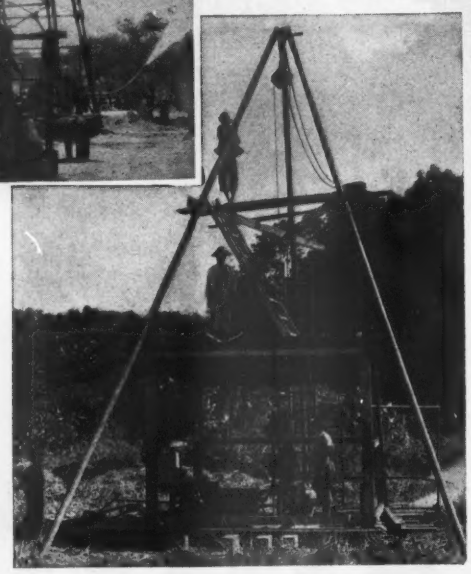


Below — One of several Sullivan Diamond Drills at work in a Borneo jungle, for the Anglo Saxon Petroleum Company.



Above—A Sullivan Drill brought in the cheapest wildcat in Venezuela, at 4,350 ft.

ALL over the world Sullivan Diamond Drills have reduced the cost of oil exploration. In Santo Domingo, Venezuela, Peru, Colombia, Ecuador, Argentina, Mexico, Algeria, India, Borneo, Canada, Portuguese East Africa, Roumania, Russia, Persia, and in all oil fields of the United States they have made deep tests and explored structure.

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condensation effect is considered. The extent of some of these changes is really surprising. For example, Killingsworth No. 3, under continuous flow, by the ordinary calculation of merely subtracting the input gas from the trap gas, shows that 367 feet of gas is being removed from the sand for every barrel of oil taken out. By the method of calculation suggested herein, 384 feet of gas is actually being returned to the sand for every barrel of oil withdrawn.

Factors Open to Question

It is admitted that many of the factors used in these calculations are open to serious question. No two conversion curves made independently and by different methods can be made to check within 25 per cent or more. The actual observed gasoline content of the trap gases has had to be assumed. The results therefore are without quantitative value as applied to the particular wells from which the basic data were obtained. The point of the whole matter is: If gas-oil ratios are to be used as a guide to recovery efficiency production methods, and forecasts as to the life of a field, they should be computed with due regard to all the factors involved, of which condensation effect is an extremely important one. Any carefully prepared conversion curve is better than none. Actual gasoline content is easily determined. Very careful measurements of trap gas under different pressures, and almost continuous testing for gasoline content would be necessary to determine the effect, if any, of trap pressures on total gasoline output. If these elements are given weight, however inaccurate they may be in themselves, the results obtained through their use will be a much more valuable guide than any result which ignores all of them and the fundamental principles which they represent.

SPACING OF WELLS IN LONG BEACH FIELD

(Continued from Page 138)

ate recovery per acre than they do per well as compared to the shallow zone wells of this same area.

Areas D and D'—Deep Zone

These areas comprise 15 acres each, on which only deep zone production is compared here. The productive life considered has been about one year.

	No. wells	Total recovery	Recovery per well	Recovery per acre
D ...	5	737,020	147.404	49.135
D' ...	17	2,335,581	137,387	155,705

The average acreage per well in D is 3.0 and in D' it is 0.88. Development in this area is more recent and consequently the productive life to date, shorter than in any other comparison which has been made.

Ratio of acreage per well ..	D' to D	1:3.4
Ratio of recovery per acre ..	D to D'	1:3.17
Ratio of recovery per well ..	D' to D	1:1.07

These wells are practically all still flowing. They show over three times the production per acre from D' as from D up to the date considered. Their recovery per acre surpasses that of D so that it is certain that with the present wells it will not reach the closely drilled area in this respect.

Conclusion

Due to the size and shape of the areas chosen, their similarity geologically within each group, and their location in widely separated parts of the field, it is felt that the above are representative comparisons and therefore legitimate to use for a few general conclusions.

In no case has the recovery per acre in wider spaced areas reached the recovery per acre in closely drilled areas. The difference between them is greatest during the early life and tends to decrease during the later years. This contention is further supported by noting the way which wells in both types of development produce about the same amount per well during the flowing, or flush, stage which fact necessarily gives a greater acreage recovery during that period B-B' and D-D' support this statement whereas C-C' recovery per well shows considerable favor for the wider spaced area in the deep zone at present. However, this fact may be explained by the performance of the wells which have not had a very long flowing life, so that a fair portion of the oil recovered has been derived after that period.

It is apparent that a greater yield of oil will be obtained from an area closely drilled than from a similar one with wide spacing. However, the economic return on the investment then becomes the governing factor to determine whether, under current market conditions, such additional expenditure is justified.

The conclusions drawn in this paper are taken from a study of a field of very great thickness of oil sands of great productivity. They should not be considered as applicable to one of a single, thin sand. It is, however, believed that they will be of use in fields of a similar nature to Long Beach.

COMMITTEE OPPOSES COMMERCIAL DISCOUNTS

(Continued from Page 154)

factor, while in another part of the State prices are dominated by the eastern refined market situation. He said the price was constantly changing, often moving up or down within a 24-hour period.

The posting of tank car prices based on long-time contracts and just where the price should be posted were other intricate details of this provision which were discussed by other committee members.

Despite the objections raised to this tank car posting, it was apparent that Mr. Klein and other members of the Interpretation Committee believes that the code intended that the posting should include all classes of tank car prices as well as tank wagon and service station prices. Mr. Jones, who is chairman of the general committee which formulated the code, said this provision was one of the most important of the entire code and should be accepted to include tank car prices.

Commercial Discounts

As soon as the commercial discount provision was taken up it was apparent that a majority of the committees felt that the only feasible method of solving this problem was to amend the code and prohibit all discounts at service stations.

W. S. Farish, president of the Humble Oil & Refining Co., said he favored the original provision of the code as adopted by the board of directors of the American Petroleum Institute at its annual meeting last December. At that time the giving of commercial discounts was limited to buyers engaged in the commercial transportation of passengers and freight. The rule as now interpreted gives the discount to all buyers operating commercial vehicles properly licensed by public authorities for that purpose. The original provision would have limited the discount to operators of bus and freight lines and others making a business of transportation with motor vehicles. Now the discount is open to all operators of delivery cars and trucks including private concerns when licensed as commercial vehicles by the state.

Under the present interpretation it was contended it is impossible to control the practice equitably. It was pointed out that the laws relative to licensing commercial vehicles are not the same in all states. The practice has spread so that now in many sections a commercial discount is given to any concern or individual who is able to offer the seller a large volume of business.

E. P. Angus, vice president and sales manager of the Magnolia Petroleum Co., defended the commercial discount as a provision of the code. He said that the discount had been made necessary by the independent dealer who started the practice and who would continue to do so making it mandatory that other companies meet this competition.

Mr. Boyd, following the adoption of the motion asking that the code be changed to prohibit commercial discounts at stations, gave little encouragement as to favorable action by the board of directors of the Institute. He explained

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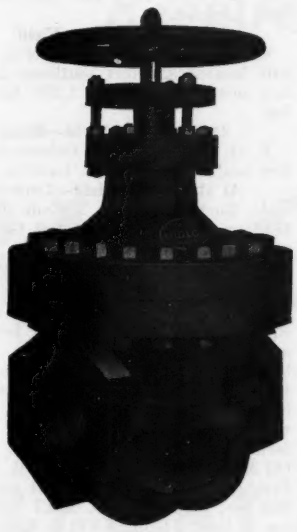

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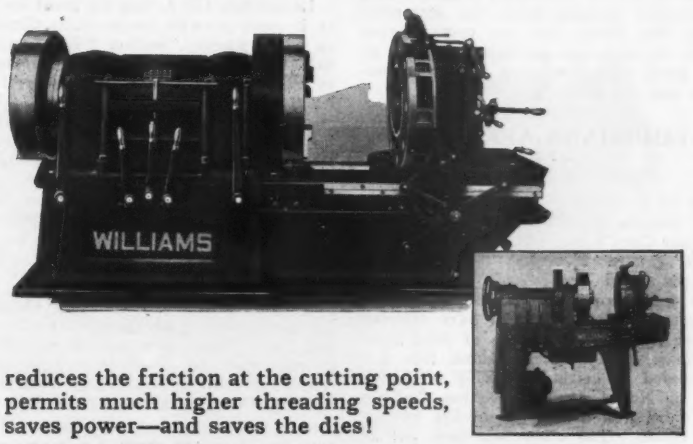

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that recognition was given the commercial discount because a few companies considered it a sound marketing practice and refused to discontinue it.

Painting Stations

The question of repainting stations of dealers when the account changes hand was discussed. It is the consensus of opinion that the company taking over the station should be allowed to paint the station with its own distinctive colors or some neutral color. It was explained that this practice has been followed in the West Coast States for some time. The painting is done without charge to the dealer.

In regard to Rule 1 the question was submitted regarding the remodeling of the station, involving the changing of storage and pumping equipment without charge to the dealer. Mr. Klein said that as long as the station location was not changed it was permissible to change the equipment location.

Under the same rule the question was submitted as to whether or not the code permitted an oil company to replace old pump equipment with new without charging the dealer for the new installation. It was pointed out that in many cases the companies were replacing old pumps with the new type electrical pumps involving a large additional cost. Some of the speakers on this point felt that the code should limit this practice by requiring the dealer to pay for the additional investment. Others held that oil companies were obligated to keep up-to-date equipment at their dealer stations and should be allowed to install any equipment desired as long as additional units were not installed. The committee took this matter under advisement.

Another question had to do with the farmer account under Rule 1. In some cases companies have installed pumps for farmers where large quantities of gasoline are used. It was held that this type account should be held to provisions of Rule 1, which means that in any new installations the farmer will be required to pay the cost of installation.

Charles Sutherland, chairman of the Nebraska committee brought up a case under Rule 7 which prohibits the selling of products below cost for the purpose of injuring a competitor. In this case a large company was alleged to have sold products under the cost of production in order to attract additional business. This discussion brought forth the statement from Mr. Klein that the cost referred to in the code was the cost laid down at the point of consumption plus a reasonable cost for handling.

LOUISIANA-ARKANSAS

(Continued from Page 70)

tion 21-17-6, made 2,520,000 feet at 1,020 pounds, total depth 2,450 feet and Palmer Corp.'s No. 1 Boykin, Section 21-17-6, gauged 2,700,000 feet at 1,100 pounds, total depth 2,450 feet. These two wells are near the Boykin crater which does not appear to have affected either pressure or volume of later completions. Northern Louisiana Gas Co. succeeded in getting a string of 6-inch set in No. 4 Boykin, Section 20-17-6, the third well drilled as a relief well to the crater. The other two blew out at 500 feet and 900 feet from water sands into which gas from the crater had escaped.

Shreveport Contractors, Inc., has taken over No. 1 Buie, Section 17-15-5, abandoned some time ago at 1,900 feet. The well is a wildcat 5 miles southeast of Richland production and is to be taken to 3,000 feet. If it checks right it will then go to 4,000 feet. Ruston Drilling Co. got the top of the gas rock at 3,275 feet in a well drilled 3 miles east of the Buie, which is 1,000 feet lower than it is found in the proven area.

R. L. Gas is reported to have drilled 14 feet of sand, total depth 3,414 feet, in No. 1 Long-Bell Lumber Co., Section 26-8-14, and will set 6-inch at around 3,390 feet for a test. The well showed oil and gas at 1,852 feet, in the top of the chalk and is now in the same sand that A. H. Turver got in No. 1 Long-Bell, Section 29-8-13, at 3,535 feet. Gay is standardizing No. 4 Bowman-Hicks, Section 14-7-14, two locations west of the discovery well of the Zwolle district, which has been standing 250 feet from the top in oil, total depth 2,350 feet.

Cotton Valley

Magnolia Petroleum Co.'s deep well in Cotton Valley, No. 1 McCook & Hibbler, Section 22-21-10, ran testing tool on 1 foot of sand, total depth 6,888 feet, and got 284 joints of mud but no showings.

Arkansas Fuel Oil Co. has leased 16,000 acres of the Crossett Lumber Co.'s land centering on the common corner of Townships 18 and 19, Ranges 6 and 7, Ashley County, and is obligated to start a well on or before November 22. J. C. Cubage and others have a 9,000-acre block centering on Section 28-8-22, Clark County, 15 miles northwest of Gordon. Blackwell Oil & Gas Co. abandoned No. 1 Wyver, Section 21-9-23, Johnson County, as a dry hole at 5,318 feet and the Johnson-Gunmer Co. abandoned No. 1 Cargile, Section 4-18-13, Union County, just south of Champagnolle, as a duster at 3,341 feet.

EAST TEXAS

Gulf Refining Co.'s deep test in Shelby County, Texas, No. 1 Carraway in the G. H. Patterson Survey at 6,580 feet has derrick up for No. 2 Pickering in the same survey, three-quarters of a mile west of No. 1, which is producing from 3,382 feet. Three completions in the Waskom district of Harrison County leave that gas field without an operation under way. Nick Barbare's No. 1 Abney, J. J. Blair Survey, made 1,000,000 feet of gas through tubing and packer from 2,388 feet and C. H. Lyons' No. 2-A Furrh in the Joel Lipscomb Survey made 1,500,000 feet in the same manner from 2,378 feet. Mason and others abandoned No. 1 Dean in the J. W. Crofts Survey on account of salt water at 2,804 feet. T. C. Adams and others' No. 8 Adams in the E. Jones Survey of Panola County, made 1,500,000 feet of gas through tubing and packer from 971 feet. Magnolia Petroleum Co.'s No. 1 Leigh-Trosper in the B. Stephenson Survey, an old well drilled deeper, was junked at 2,620 feet and D. Thomason's No. 1 Tillery in the Jane Thorpe Survey, made 1,500,000 feet, total depth 2,355 feet.

MISSISSIPPI

Lauderdale Oil & Gas Co. went as far as it could go with funds at its disposal on No. 1 Lackey, Section 2-7-6, Lauderdale County, Mississippi, and arranged to sell off more acreage to finance it to 3,250 feet after shutting down at 2,787 feet, a shockholders meeting being called for October 7. Home Oil Co.'s No. 1 Rayne, Section 13-5-1e, Rankin County, is drilling at 1,435 feet claiming to have topped the Wilcox 470 feet higher than it was found in the Lion Oil Refining Co.'s No. 1 Misterfelt in Section 2-4-1e.

ALABAMA

Robinson & Greer's No. 1 Douglas Oil Co., Section 15-9-2w, Choctaw County, Alabama, cored green sandy shale at 3,280 feet. They were out of the chalk at 3,170 feet and expect to find the sand that showed oil in No. 1 Long-Bell, Section 28-10-4w, at around 3,500 feet.

SOUTHWEST TEXAS FIELDS

(Continued from Page 73)

nen, who worked out the geology, based the location on a Lagarto high in the Reynosa. Mr. O'Neil was until recently vice president of the California Petroleum Co., and the test is financed by California capital. This is one of those interesting tests that are going to be watched with much interest along the Reynosa outcrop and extending northeast as far as the Humble Oil & Refining Co.'s Raccoon Bend Field in Austin County.

Humble Field—Duval

Humble Oil & Refining Co.'s No. 33 Kohler, Survey 164, located 330 feet north and west lines, at 1,792 feet, waiting on tubing. No. 35 Kohler, Survey 165, located 330 feet south and east lines, is derrick. No. 36 Kohler, Survey 424, located 330 feet north and east lines, is location.

Schoolfield-O'Byrne Field

C. E. Long (Shell) No. 1 C. W. Hahl, Survey 280, Block 24, located 150 feet north line, 750 feet east line, at 60 feet, standing. Magnolia Petroleum Co.'s No. 8 Hahl, Survey 250, Block 24, located 150 feet south line, 750 feet east line, at 410 feet, is drilling. No. 1 Lundell, Survey 60, located 450 feet north line, 150 feet west line of SE of survey, is location. No. 2 Lundell, Survey 60, located 150 feet north and east lines of SE of survey, is location. Onyx Petroleum Co.'s No. 5 Krauter, Survey 250, Block 20, located 150 feet south and east lines of block, is location. G. M. Partee's No. 6 Moody, Survey 60, located 510 feet north line, 150 feet west line, is location. S. & O. Oil Co.'s No. 7 Hahl Survey 250, located 450 feet south line, 150 feet west lines, is derrick. No. 9 Hahl, Survey 250, Block 22, located 450 feet north line, 150 feet west line, is location.

Randado Field—Jim Hogg

Randado Oil Corp.'s No. 35 Palacious, Survey 291, Block 2, located 150 feet south line, 450 feet east line, at 100 feet, standing. Magnolia Petroleum Co.'s No. 1 N. Hinnant, Survey 20, Block 1, located 600 feet north and west lines, is location.

Henne-Winch-Fariss Field

George S. Marshall's No. 4 Holbein, Survey 11, Block 10, Share 3, 150 feet south and west lines, derrick up. No. 5 Holbein, Share 3, Block 10, Survey 15, 150 feet north and west lines, rigging up. O. W. Killam's No. 1 J. G. Martinez, Survey 2, located 550 feet west line, 150 feet south line of SE of survey, is derrick.

Schott Field—Webb

Livingston & Payne's No. 1 Guerra-Ochoa, Survey 58, located 917 feet east line, 470 feet south line, at 1,649 feet, cleaning out preparing to set casing.

Mid-Ojuelos Field

Crown Petroleum Co.'s No. 2 E. Garcia, Survey 463, Block 2, located 330 feet north line, 660 feet east line, at 1,200 feet, drilling.

Carolina-Texas Field

W. R. Shankle's No. 2 Webster, Survey 684, located 1,170 feet west line, 150 feet south line, rigging up.

Magnolia Cole Field

Cole Petroleum Co.'s No. 67 Benavides, Survey 412, Block 12, located 313 feet east line, 160 feet north line, at 38 feet, standing. Magnolia Petroleum Co.'s No. 1 J. G. Valdez, Survey 754, Block 15, located 150 feet south and west lines, is derrick. No. 2 J. G. Valdez, Survey 754, located 330 feet north line, 660 feet east line, Block 2, is location. No. 1 A. Benavides, north half of Survey 660, located 660 feet south and east lines, at 100 feet, drilling. No. 1 S. Perez, Survey 460, J. Poitevent Survey, 1,980 feet north line, 660 feet west line, is location. No. 2 King-Harper, Survey 323, Block 2, located 660 feet north and east lines, is location.

Cole Gas Field

Co-Operative Drilling Co.'s No. 3 Dinn, NE NW, Survey 454, located 60 feet west line, 450 feet south line, is location. Houston Oil Co.'s No. 2-G R. Benavides, Survey 701, located 666.2 feet south line, 666.3 feet east line, is location. John J. O'Hern's No. 3 Benavides, Survey 694, Block 5, located 450 feet south line, 150 feet west line, moving on. O. W. Killam's No. 13 Bruni, Survey 3, Adams Subdivision, Bruni Lands, Mariano Arispe Grant, 491 feet southwest line, 200 feet southeast line, Block 1, at 1,371 feet, drilling. Magnolia Petroleum Co.'s No. 1 D. Benavides, Survey 694, 660 feet south and east lines, location. No. 2 H. Benavides, Survey 697, located 660 feet north and west lines, SE SW, at 2,200 feet, drilling.

Jennings Field—Zapata

Blair & Acklin's No. 2 Trevino, Survey 66 Block 1, located 150 feet west line, 190 feet north line, at 450 feet, standing. Blakenship and others' No. 1 Trevino, Survey 413, located at 2,480 feet south and east lines, location. No. 1 Garza, Survey 64, Block 7, located 150 feet north and east lines, at 50 feet, drilling. Evans and others' No. 1 Trevino, Survey 62, located 1,490 feet north line, 1,490 feet west line, at 1,300 feet, coring. Killam-Duggan's No. 7 Cuellar, Survey 277, located at 2,840 feet east line, 1,650 feet south line, spudded in. O. W. Killam's No. 16 Cuellar, 165 feet southeast line, 828 feet southwest line of 160-acre Cuellar tract out of 1,772-acre tract, Cerrito Blanco Grant, at 1,320 feet, drilling. No. 2 Flores, Survey 250 and south of Survey 110, located 1,565 feet east line, 150 feet north line, derrick. South Texas Production Co.'s No. 1 Roy Jennings, Mira Flores Grant, 18,055 feet southwest line, 11,040 feet southeast line, at 3,280 feet, drilling. No. 6 Joe Jennings, Cerrito Blanco Grant, 2,640 feet southeast line, 660 feet northeast line, location.

Mirando Valley Field

O. W. Killam's No. 1 Flores, Survey 240, located 850 feet southeast line, 560 feet northeast line, at 1,260 feet, drilling.

Dobrowolski Field—Bexar

F. H. Eckert's No. 4 Dobrowolski, 330 feet southwest of No. 3, location.

Al Buchanan Field—Caldwell

Al Buchanan's No. 1 Cude 21 acres, William Spiller Survey, 450 feet northwest line, 150 feet southwest line, at 1,550 feet, approximate depth, set casing.

Joe Bruner Field

J. W. Allen's No. 1 A. B. Jackson, Spencer Morris Survey, 150 feet north and west lines, at 2,631 feet, plugged back from 2,838 feet to shoot. T. C. Hadley's No. 1 Hanson, James Hinds Survey, 150 feet south and east lines of west half of east 20 acres of Hanson farm, at 2,640 feet, shut down. Humble Oil & Refining Co.'s No. 5-A M. Briscoe, James Hinds Survey, 206 feet north line, 485 feet west line, at 2,467 feet, drilling in lime. Humble Oil & Refining Co. and Luling Oil & Gas Co.'s No. 9 C. F. Dye, 300 feet east of No. 2, is rigging up. No. 9-C Floy Gray, is rigging up. Magnolia Petroleum Co.'s No. 2 Merriwether, A. Floyd Survey, 150 feet northwest and northeast lines of lease, at 2,310 feet, drilling.

Darst Creek Field—Guadalupe

Gulf Production Co.'s No. 1 C. Anderson, Jacob C. Darst Survey, 150 feet south and east lines, location. No. 1 Tadlock, Jacob C. Darst Survey, 150 feet from northwest corner, location. Magnolia Petroleum Co.'s No. 1 R. C. Appling, James Hodges Survey, 150 feet west and south lines, at 1,500 feet approximate depth, drilling. Shell Petroleum Corp.'s No. 1 Denman, Ira Nash Survey, is core drilling. Simms Oil Co.'s (Penn) No. 2 Manford, offsetting Penn's No. 1 Manford 400 feet to the northeast, at 2,775 feet, drilling in Austin. Sun Oil Co.'s No. 1 Manford, James Hodges Survey, 1,950 feet southeast lines, 150 feet southwest lines, at 2,848 feet, reaming crooked hole. The Texas Company's No. 2 Dallas Wilson, Jacob C. Darst Survey, 150 feet south and west lines, is derrick. No. 2 L. Anderson, 150 feet out of northeast corner, at 685 feet, shut down. No. 3 L. Anderson, 150 feet north and west lines, location. No. 4 L. Anderson, derrick. H. H. Weniert's No. 1 A. E. Dowdy, Jacob C. Darst Survey, 100 feet south line, 36 feet east line, location. No. 2 A. E. Dowdy, Jacob C. Darst Survey, 100 feet north line, 36 feet east line, location.

Kingsville Field—Kleberg

Humble Oil & Refining Co.'s No. 8 R. J. Kleberg, K.T.&I. Survey, Section 40, Lot 7, 150 feet south and east lines of lot, location.

Cartwright Field—Live Oak

Houston Oil Co.'s No. 2 J. B. Dunning, M. B. Kilvin Survey, 1,445 feet north of No. 1, derrick.

Rockdale Field—Milam

Texas Petroleum Development Co.'s No. 1 Milton Phillips 80 acres, J. J. Chambers Survey, in center of Rockdale Pool, 600 feet north of No. 14, rigging up, Edwards lime test.

Agua-Dulce Field—Nueces

Agua Dulce Oil & Gas Co.'s No. 1 Otto Wolters, Section 34, Benton Pasture Subdivision, at 2,047 feet, standing. No.

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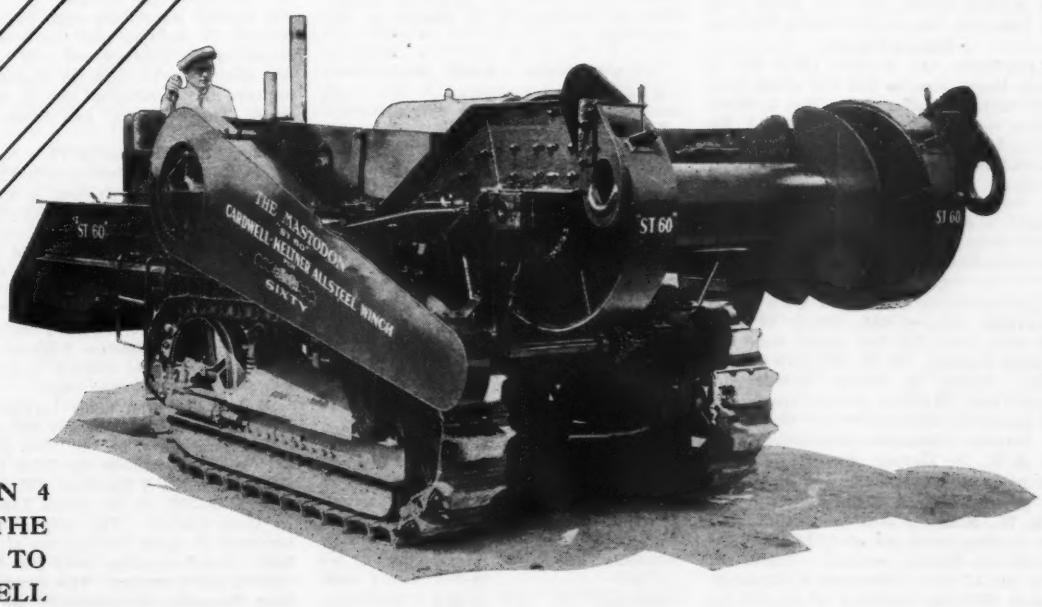

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2 Otto Wolters, Section 34, Benton Pasture Subdivision, 1,470 feet north line, 2,750 feet west line of section, at 1,978 feet, set 6⅝-inch casing.

White Point Field—San Patricio

LaFeria Oil & Gas Co.'s No. 1 C. C. Smith, J. C. White Survey, 690 feet north line, 350 feet east line, rigging up. Spencer & Rhodes' No. 2 Texas Company fee, Lot 6, Roos Subdivision, 150 feet south and west lines of west 50 acres, is standing with derrick partly built.

Nursery Field—Victoria

Humble Oil & Refining Co.'s No. 3-A Jay J. Welder, D.L.&C. Survey, 1,634 feet southeast lines, 736 feet southwest lines, at 4,939 feet, drilling.

COMPLETIONS

Caldwell County

Humble Oil & Refining Co.'s No. 8 T. A. Tiller, 75 bbls. Humble Oil & Refining Co.'s No. 8 C. F. Dye, 300 bbls.

Nueces County

Agua-Dulce Oil & Gas Co.'s No. 1 Bessie Kerr, Section 36, total depth 2,003 feet, 800,000,000 feet gas, 890 pounds rock pressure.

Webb County

Magnolia Petroleum Co.'s No. 2 H. Benavides, Survey 697, total depth 2,329 feet, 30,000,000 feet gas, 550 pounds rock pressure.

Zapata County

O. W. Killam's No. 16 Cuellar, total depth 1,493 feet, 30 bbls.

ABANDONED TESTS

Bastrop County

The Texas Company's No. 8 Yoast, A. Garcia Survey, dropped from reports.

Caldwell County

Humble Oil & Refining Co.'s No. 1 M. Barber, Squire Damon Survey, total depth 2,300 feet, abandoned.

Humble Oil & Refining Co. and Luling Oil & Gas Co.'s No. 7-A Johnson has derrick up.

Duval County

S. & O. Oil Co.'s No. 5 Bowe, Survey 250, Block 21, located 450 feet south line, 150 feet west line, at 2,310 feet, drilling.

Jim Hogg County

Magnolia Petroleum Co.'s No. 1 Weil, Survey 5, Block 2, 660 feet north line, 349 feet east line, location. A. W. Major's No. 1 Holbein, Block 6, Share 3, Las Animas Grant, 150 feet north line, 325 feet east line, at 2,000 feet, drilling.

Nueces County

Agua-Dulce Oil & Gas Co.'s No. 2 Bessie Kerr, location 300 feet south line, 1,200 feet west line from No. 1 Well, rigging up. R. & G. Corp.'s No. 1 Ed Allen, R. Peter No. 6 Survey, Block 8, 200 feet north and west lines of block, location.

San Patricio County

Spencer & Rhodes' No. 1 H. L. Steele, Lot 6 Roos Subdivision, 200 feet south and west lines, is location.

Webb County

Carolina-Texas Oil & Gas Co.'s No. 8 Benavides, Survey 683, Block 12, 450 feet west line, 150 feet south line, has resumed drilling. O. W. Killam's No. 14 Bruni, Survey 5, Adams Subdivision, Bruni Land, Mariano Arispe Grant, 150 feet northwest and southwest lines, Block 11, derrick. Magnolia Petroleum Co.'s No. 2 W. S. Harper, Survey 332, 660 feet north and east lines, location.

Zapata County

O. W. Killam's No. 17 Cuellar, 160 acre Cuellar tract out of 1,772-acre Cerrito Blanco Grant, location. Loyal Oil Co.'s No. 17 J. G. Martinez. C. Redondo Survey, 600 feet northeast of No. 10, location; its No. 18 J. G. Martinez, C. Redondo Survey, 300 feet northwest of No. 17, location; its No. 19 J. G. Martinez, C. Redondo Survey, location.

KANSAS FIELDS

(Continued from Page 69)

is a cellar. Barnsdall Oil Co.'s No. 1 Johnson, NE cor. SW, Section 9-13-19w, has been completed for 206 bbls. in sand 3,597-3,605 feet.

Rooks County

Stearns & Streeter and others made location for No. 1 Levengood, SW cor. NE, Section 11-9-16w.

Greenwood County

The Prairie Oil & Gas Co.'s No. 1 Sharp, NW cor. SE NE, Section 7-24-13, has been completed for 55 bbls. in sand 1,654-70 feet. No. 4 Webber, CNL NW SE, Section 9-25-13, made 240 bbls. in sand 1,508-30 feet.

Pawnee County

The Prairie Oil & Gas Co. made location for No. 1 Black, NE cor., Section 11-20-18.

Russell County

Kress, Houck and others made location for No. 1 Rockefeller, SE cor., Section 6-13-12w. Jamot Brown and others made location for No. 1 Black, NE cor. Section 7-14-15w.

Rush County

Sinclair Oil & Gas Co.'s No. 1 Senesser SE cor. NW NW, Section 8-18-17w, is dry and abandoned at 3,840 feet.

Sedgwick County

Bu Vi Bar Petroleum Corp. is erecting the rig for No. 5 Reed, SE cor. SW SE, Section 1-26-1w, Valley Center Field. Skelly Oil Co. and Davis' No. 14 Wilson, NW cor. NE, Section 1-26-1w, is rigging up. Bu Vi Bar Petroleum Corp. and others' No. 2 Hudson "A", NE cor. NW NE, Section 12-26-1w, is a rig. Tavender Oil Co. has the rig up for Uo. 1 McLean, SE cor. SW SE, Section 23-26-1w. Wentz Oil Corp. and others' No. 1 Alliston, NE cor. NW, Section 24-26-2, is rigging up.

Twist and others' No. 1 Rayburn, NW cor. SW SE, Section 4-25-1w, has been abandoned at 1,980 feet. Shell Petroleum Corp.'s No. 2 Brown, SW cor. NE SE SW, Section 15-26-2, Greenwich Pool, has been completed for 1,209 bbls. in chat 2,905-10 feet. No. 2 Fischer, SE cor. NE SE, Section 15-26-2, has been completed for 422 bbls. in sand 3,198-3,200 feet. G. L. Ramsey and others' No. 1 Evans, SW cor., Section 2-26-1w, is dry and abandoned at 3,065 feet. Bu Vi Bar Petroleum Corp. and others' No. 8 Wright, NW cor. NE NE, Section 12-26-1w, has been completed for 511 bbls. in sand 3,370-75 feet. Johnson & Marshall's No. 1 Roy, NE cor. SE SW, Section 23-29-1w, is a dry hole at 3,856 feet.

Sedgwick County Production

The daily average production by companies and leases in Sedgwick County area for October 3, is shown by the following:

Company, lease—	S.T.R.	Wells	Bbls.
Aladdin:			
Bennington	6-26-1	3	310
Barnsdall:			
Rapp	26-26-2	1	Off
Bu-Vi-Bar et al:			
Branch	6-26-1	2	545
Bright "A"	6-26-1	2	180
Bright "B"	6-26-1	5	1,465
Byers	7-26-1	1	120
Corr	1-26-1w	8	2,615
Emrich	6-26-1	2	580
T. Goodrich	6-26-1	5	365
Lantz	12-26-1w	3	420
Lyons	7-26-1	3	433
Miles	7-26-1	1	10
Reed	1-26-1w	4	2,495
Roll	7-26-1	1	265
Rothfuss	6-26-1	1	5
Shawver	7-26-1	9	5,795
Wright	12-26-1w	8	3,843
Woodward	7-26-1	1	213
Connell:			
Cross	27-25-1w	1	10
Continen al:			
Goodrich	16-25-1	2	1,043
Black No. 1	16-25-1	1	18
Westerfield	14-25-1	1	22
Davis-Skelly:			
Wilson	1-26-1w	13	2,293
T. M. Deal:			
Townsite No. 1	15-26-1	1	233
Derby:			
Bowling	6-26-1	1	41
Gorman	6-26-1	4	317
Hladik	15-26-2	1	174
Dickey et al:			
Robbins	21-28-1	1	232
Dickey:			
Nolan	21-28-1	1	82
Gypsy:			
Hamant	14-26-2	3	259
Hays & Moriarity:			
Hladik	15-26-2	2	338
W. F. Kinney:			
Richards	15-26-2	1	299
Tripp	15-26-2	1	422
E. W. Marland, Inc.:			
Mackey	30-27-2	1	53
Mars Oil Co.:			
Miller	2-26-2	1	31
Mary Jane:			
Fitch	6-26-1	2	522
Montour:			
Lavender	6-26-1	2	738
Patton & Wentz:			
Swenson	6-26-1	1	68
Phillips Pet. Co.:			
Difford	1-26-1w	3	93
Piefer	6-26-1	1	72
Plains Oil Co.:			
Corn No. 1	15-26-1	1	98
Prairie:			
Cross	27-25-1w	1	37
Swyser	36-25-1w	3	210
Producers & Refiners:			
Kuske	24-25-1	1	115
Pyle & Sutter:			
Caldwell	6-26-1	2	198
Ramsey:			
Mason	15-26-1	2	105
Reynolds & Hays:			
Rolls	7-26-1	1	587
Robertson et al:			
Creson	6-26-1	1	673
Rogers:			
Johndro	15-26-2	1	220
Stollie	15-26-2	1	362
Shell Pet. Corp.:			
Hamant	22-26-2	1	523
Fisher	15-26-2	2	145
B. Lygrisse	15-26-2	1	343
C. Lygrisse	15-26-2	1	787
Lygrisse	22-26-2	1	52
Brown	15-26-2	2	1,855
No. 1 Community	15-26-2	3	630
Nolan	21-28-1	1	36
Stearns & Streeter:			
Roll	7-26-1	1	523
The Texas Co.:			
Blood	21-28-1	1	125
Tidal:			
Scherger	6-26-1	3	87
Vickers:			
Nesson	6-26-1	3	135
Wentz:			
Bright	1-26-1w	2	545
White Eagle:			
Baylor	6-26-1	1	10
Robbins	20-28-1	2	213
Total		145	35,692

ROCKY MOUNTAIN AREA

(Continued from Page 77)

No. 1 Cafky, SE cor., Section 16-20-69, is spudding in an 8-inch hole with standard tools.

Beulah Dome Test

A test on the Beulah Dome, in Pueblo County, being drilled by the Beulah Dome Syndicate in its No. 1 Headland, NW SW, Section 7-23-67, is attracting some attention. It is bottomed at 750 feet in the lower Morrison with 550 feet of water in the hole. At 740 feet there was a good show of oil on top of the water. Casing is being run and will be set before drilling into the next sand expected within the next 25 feet. The Boone Oil & Gas Co.'s No. 1 Ritter, NW Section 33-18s-60, near Tacony, which has been drilling intermittently since 1925, is sidetracking tools at 3,050 feet. There is considerable doubt as to the identity of the horizon, but a geologist recently examining some cuttings expressed the opinion that the hole is bottomed in the Carlisle and will have 300 feet more to go to reach the Dakota which appears to be running low in that district. The hole has had several good shows.

The Phillips Petroleum Co.'s No. 1 Andrews, NW NW, Section 3-2s-42, Yuma County, is reported drilling at 4,015 feet in a formation showing considerable gray lime which is an indication that it is passing out of the red beds and into the top of the Pennsylvanian. The 6⅝-inch will be set as soon as a good seat is found.

The Helium Co.'s No. 1 Van Vleet, SW cor. NW, Section 1-30s-60, Model Dome, Las Animas County, is drilling at 680 feet in hard sandy lime.

A deal has been made between S. C. Hoel and associates whereby the Argo Oil Co., a subsidiary of the New Bradford Oil Co., will complete the High Line Oil Syndicate's No. 1 Peerless, NE cor., Section 23-8s-104, on the High Line Dome in Mesa County. The hole is reported bottomed at 2,712 feet, on top of the Dakota. Good showings were found in this well in the Frontier. The structure has been favorably recommended by several geologists and the well originally was started by the Midwest Refining Co. which withdrew on account of the title situation. The titles were subsequently cleared up and permits extended.

WYOMING

The discovery of oil in the Madison lime in the Midwest Refining Co.'s No. 36 Rosenberg, SE cor. NW Section 25-58-98, on the Frannie Dome, Park County, Wyoming, continues to be widely discussed among the oil men in the Rocky Mountain area, with a division of opinion existing as to its importance. It will be recalled that this well was started on the north side of a fault, drilled through the fault and found water in the Embar and Tensleep sands. Then it went on down and at 3,005-12 feet made 500 bbls. a day from the Madison lime, a horizon not tested previous to that time on any proven Wyoming structure. The hole was drilled deeper and the oil increased. At 3,013½ feet it was putting several hundred barrels into the tanks per hour, the total being 2,424 bbls. the first 24 hours. Drilling was immediately suspended and the well was shut in. No one knows what it would have made if allowed to flow any length of time from the final depth. There was no water with the oil nor any gas. The fact that it was flowing indicated a hydrostatic pressure back of the oil with the possibility production was coming from a crevice and would soon be exhausted.

The geological significance of the discovery is that a new horizon has been opened in Wyoming and that there are scores of structures in the Big Horn Basin and other areas which hold out considerable promise of being productive in the lower horizon. Some of these structures, already proved for oil or gas, or both, in the Embar and Tensleep, are comparable with Salt Creek in area. The Salt Creek Field is now being tested below present producing horizons and the Madison probably will be proven or disproven in this well.

The economic significance of the new discovery is not quite so promising. The oil is a heavy black product testing 18.3 degrees gravity and showed a sulphur content of 3 per cent and 2 per cent naphtha. The refineries do not want this grade of oil at this time and there isn't a large enough market for road oil to warrant the producing of the well. The Midwest and the Ohio Oil Co. have a production of 4,000 to 5,000 bbls. a day of this heavy oil in the Grass Creek Field, with pipe lines, and every facility for handling it, but the wells have been shut in for several years for lack of a market. It is doubtful if the company will go to the expense of erecting sufficient tankage to make a prolonged test under these circumstances. However, the grades of crude vary in the same horizon in different localities in Wyoming and tests in other districts may show a better grade of oil.

Madison Lime Tests

The discovery has caused some investigation as to wells drilled in the past about which little has been reported and which may disprove the theory that the Frannie well was the first to drill the Madison lime on a productive structure. This has resulted in a report, not officially confirmed, that last spring the Enalpac Oil & Gas Co. tested the Madison lime in its No. 2 Cactus, SE cor. Section 6-51-100, on the Oregon Basin structure and completed the well at a total depth of 4,765 feet with a production the first 24 hours of 1,750 bbls. It is supposed to have found the pay at 4,688-4,765 feet. The depth indicates it was in the Madison lime, or at least considerably below the Embar-Tensleep series, the producing horizons at Oregon Basin. This well is an offset, and one location west of the same company's No. 1 Cactus, SW cor. Section 5-51-100, which was completed in the Embar-Tensleep at 3,310-3,670 feet for 1,000 bbls. No. 2 apparently was drilled 1,100 feet deeper than No. 1 and there are no surface or geological factors known which would account for the difference if both were completed in the same horizon.

Other drilling operations in Park County include the following: Ohio Oil Co.'s No. 1 Burlington, Section 21-53-101, Shoshone Dome is bottomed at 1,347 feet and changing over to rotary. Cody Petroleum Co.'s No. 1 Nelson, NE SE NE Section 4-51-102, Diamond Basin, is reported abandoned at a total depth of 4,302 feet. The top of the Tensleep at 3,800 feet was dry. Midwest Refining Co.'s No. 1 Rosenberg, NE cor. Section 26-58-98, Frannie dome, is drilling at 1,802 feet in black shale, and the California Exploration Co.'s No. 2, NW NE Section 14-48-102, Pitchfork Dome is standing at 1,890 feet

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CALIFORNIA FIELDS

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it only showed a small initial production. The daily output of No. 26 Harvey, The Texas Company's new completion, 160 bbls., is also rather unsatisfactory due to an excessive water content which approximates 50 per cent.

Midway-Sunset

The Maricopa Flats section of the Midway-Sunset Field of Kern County occupied a prominent position in the spotlight this week due to the completion of two new wells. The Signal Oil & Gas Co. started the ball rolling by finishing No. 4 Sheehan flowing 810 bbls. of clean 26.3 gravity oil daily from 3,325 feet and the Hancock Oil Co. followed suit by bringing in No. 1 Wallace flowing 1,410 bbls. daily from 3,160 feet. Both wells are located in Section 8-11-23. No. 4 Sheehan originally came in about two weeks ago flowing at the rate of 1,800 bbls. per day, but sanded up shortly after getting under way. There are 19 strings of tools in operation in the immediate locality of Section 8-11-23 and a check indicates the probable completion of several more satisfactory producers in the near future. The North American has three new wells nearing completion, the Standard Oil Co. two, and the Signal Oil & Gas Co., Hancock Oil Co. and Wellington Oil Co., one each. The Western Gulf Oil Co. added another new well to its list of producers in the Fruitvale Field of Kern County when No. 8-B on the Kern County lease was finished doing 250 bbls. daily from 3,683 feet. This well was carried down to 7,725 feet as a deep test before being plugged back. The Shell Oil Co. successfully finished No. 7 Jewett, a new well in the Round Mountain Field, and it is being listed for completion as a 125-bbl. pumper from 1,664 feet. There were no new wells finished at Mount Poso but a check indicates that several should be tanking oil in the near future. It has become rather common in this field to drill wells down to the top of the pay and then temporarily suspend work. This has resulted in a condition where there are about 10 potential producers within a few days of completion.

MICHIGAN FIELDS

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singer & Jordan, on the Rodey farm, Section 23; Associated Oil Co. on the Swindlehurst farm, Section 28; Athens Oil & Gas Co. on the Hoyle farm in Section 35, and Atwood and others on the Johnson farm in Section 10, Isabella Township. The Gordon Oil Co. has rigged up on Section 8, Denver Township.

Homestead Rights

Discovery of oil on state land in the Mount Pleasant Field brought before the Michigan conservation commission the problem of royalties to be paid the state or homestead owners. The commission held that mineral rights were expressly exempted in deeds given the homesteaders and that any return from oil and gas should go to the state. In future a one-eighth royalty clause will be included in leases on State of Michigan land in wildcat areas and a sliding scale will be adopted for leases in proven territory where operators may be reasonably certain of production.

In taking these steps the commission ruled counter to the wishes of Governor Fred W. Green, who is an oil operator in Arkansas and Mexican fields, and who declared that it was unfair that the homesteader should get no returns from oil or gas discovered on land which he had worked and given some value for agricultural or other purposes. It was suggested the state receive one-eighth and the homesteader one-sixteenth royalty on state lands, but the commission voted against the proposal.

Severance Tax

The Michigan state severance tax of 2 per cent on oil and gas brought in $18,380.41 during August and with production steadily increasing in the Mount Pleasant Field a continued increase in oil and gas revenue is expected. The tax is divided two-fifths to the general fund of the state, two-fifths to the township in which the oil or gas well is located and one-fifth to the county. The state is now receiving about $300 a day royalty on oil and gas wells located on state lands.

Muskegon Field

Decision to plug the first deep test in or near the Muskegon Field was announced last week by the Johnson Oil Refining Co. and No. 1 Kate Sovacool, SW SE, Section 2-10-17, Laketon Township, was completed at 3,724 feet. Water was struck at this depth 12 feet in the Niagara formation and it was decided to plug the well although for a time deeper drilling to the Trenton limestone was considered.

As the well is about half a mile outside the limits of the proven Dundee Field several other operators are considering drilling a deep test on structure. It is believed that gas in commercial quantities may be found in the Niagara limestone here as it is in Canada.

The Muskegon Pipe Line Co., operators of one of the four industrial gas lines in the field, is taking the lead in promoting the drilling of a deep test on structure in Muskegon Township.

In addition to the Johnson-Sovacool well, one small oil producer was completed in Laketon Township, the Johnson Oil Refining Co.'s No. 15 John Thompson, SE NW, Section 12-10-17, and it made 175 bbls. initial in the Dundee.

The Republic Oil & Gas Co.'s No. 3 George S. Brand, SE SE, Section 11-10-17, Laketon Township, was plugged and abandoned when it stopped flowing.

Two new locations were announced: Johnson Oil Refining Co.'s No. 1 Miles Wilkerson, SE SW, Section 2-10-17, and Buckeye Oil & Gas Co.'s No. 3 Gerritt Van Loo, NW SW, Section 11-10-17.

Muskegon Township

One 10-bbl. pumper and a dry hole constituted the only completions in Muskegon Township last week. J. V. Howard's No. 1 Charles Cook, NW NW, Section 8-10-16, swabbed 15 bbls. in 18 hours from pay struck at 2,040-50 feet in the Dundee. Continental Gas & Oil Co.'s No. 18 on County of Muskegon lease, SE SW, Section 22-10-16, was dry and abandoned at 2,167 feet.

Two new locations were made in Muskegon Township. Lima Oil Corp.'s No. 5 Louis P. Haight, NE SW, Section 9-10-16, and A. S. Cochran's No. 1 Charles I. Giles, SE NE SW, Section 6-10-16. Citizen's Petroleum Co.'s No. 2 Kooi, SW NE, Section 8-10-16, is being deepened to the Dundee.

Oceana County

A bad fishing job caused by collapsed casing has delayed drillers from completing C. J. Sipple's No. 1 Iroquois Trust Co. well, SE NW, Section 35-13n-17w, Grant Township, Oceana County. The Oceana Oil Corp.'s No. 1 Vanderwaal, SW NE, Section 35-14-17, Shelby Township, near New Era, is drilling at 2,700 feet after being dry in the Traverse and Dundee.

Newaygo County

Drillers have started driving pipe on the Atlantic Exploration Co.'s No. 1 William Brydges, NW SW, Section 12-11n-13w, Ashland Township, Newaygo County, the latest attempt to find oil or gas in the territory directly east of Muskegon County and the Muskegon Field.

The Newaygo Oil & Gas Co.'s No. 1 A. J. Bates, NE SE, Section 12-13n-13w, Sherman Township, and Uhl & Sarver's No. 1 David E. Uhl, NW SE, Section 20-13n-12w, Everett Township, are still drilling at 3,715 and 3,500 feet, respectively, as the deepest tests in Newaygo County. Both were dry in the Traverse and Dundee and operators have announced their intentions of carrying them to a maximum depth of 5,000 feet.

Ottawa County

Drilling is to be resumed on the Wright Oil Co.'s No. 1 J. Kluting, SW NW, Section 10-8n-13w, Wright Township, Ottawa County, and Royal R. Miller's No. 1 Paul Sako, NE NW, Section 27-7n-16w, Grand Haven Township.

Lake County

One of the four wildcats drilling in Lake County east of Mason County, is dry in the upper Traverse, Patterson & Day's No. 1 C. C. Davis, NE SW, Section 19-18n-12w, Cherry Valley Township, will be carried to the Dundee.

Fred J. Estes and others' No. 1 W. L. Kellogg, NW NW, Section 11-20n-11w, Dover Township, Lake County, is drilling at about 2,500 feet and operators expect to hit the upper Traverse soon. Brindel Brothers' No. 1 Jess Cummins, SE NW, Section 32-18n-14w, Sweetwater Township, Lake County, topped the Traverse at 2,130 feet and is drilling into the limestone.

Permits for two new wildcats have been issued. Grayling Development Co.'s No. 6 on State of Michigan property, SE SW, Section 36-27n-5w, Clearwater Township, Kalkaska County, structural test and Hillmur Oil Co.'s No. 1 Potter, NW NW, Section 21-4n-2e, Lock Township, Ingham County, near Lansing.

A second wildcat will be drilled in Cass County by Royal R. Miller and others for whim V. M. Voorhees, Muskegon contractor, drilled a dry hole on the Frank Knowlton lease.

Mason County

Thompson Brothers, who brought in a 2,000,000-foot shallow gas well in Mason County about 8 miles south of Manistee are planning to move their rig to a new location about half a mile from the first well.

Gas was struck at 634 feet in the Diamond-Thompson-Holland No. 1 Diamond, SE NW, Section 15-20n-17w, Grant Township.

Muskegon County Wildcats

Formations are reported to be running favorably high in the two Muskegon County wildcats drilling in Sullivan Township.

Taking into consideration a regional dip of 16 feet to the mile the red rock, first indicator horizon in western Michigan, was struck 30 feet higher in F. J. Johnston's No. 1 Johnston-Marston-Janicke, located SW NW, Section 1-9-15, Sullivan Township, than in the Cloverville Oil Corp.'s No. 1 Arthur Born, NE NE, Section 12-9-16, Fruitport Township, which was dry in the Traverse and Dundee. The Cloverville well had the red rock at 1,022 and the Johnston well, 5 miles southeast, struck it at 1,072 feet. Allowing 80 feet for regional dip the Johnston well is 30 feet higher on structure, according to M. R. Marston. The Herman Hanson Syndicate's No. 1 Foot, NE NE, Section 8-9-15, Sullivan Township, also is reported to have struck the red rock high although definite figures are not available.

Operators are hoping to open a new Muskegon County pool in the vicinity of the two drilling wells in Sullivan Township where there has been gas seepage through deep water wells for many years.

Production of Michigan

Daily and weekly production of oil in three Michigan fields showed a slight increase for the week ending Monday, September 30, with a total of 121,723 bbls. or 17,389 bbls. daily, as compared with 120,089 bbls. or 17,156 bbls. daily, the previous week.

Muskegon production, which now represents about 60 per cent of the total, dropped about 2,000 bbls. for the week as it has for the last three weeks since the figures on runs to pipe lines and refinery stills have been compiled by R. G. Bechtel, Dixie Oil Co. superintendent, for the American Petroleum Institute at New York.

Muskegon totals for the past three weeks were: September 16, 78,582; September 23, 76,024 and September 30, 74,410 bbls. Daily average production for the past week was 730 bbls. of Traverse crude and 9,900 bbls. of Dundee.

The Mount Pleasant Field of central Michigan wavered between 42,000 and 45,000 bbls. during the past three weeks setting a new high record of 45,780 bbls. for the week ending September 30. The three weeks' record was: September 16, 43,120 bbls.; September 23, 42,420 bbls.; and September 30, 45,780 bbls. Daily averages for the past week were 40 bbls. of Traverse and 6,500 bbls. of Dundee crude.

The old Saginaw Field is dropping at the rate of from 50 to 100 bbls. a week. Three weeks' record was: September 16, 1,708 bbls.; September 23, 1,645 bbls.; and September 30, 1,533 bbls. The daily average for the past week was 219 bbls.

Muskegon production figures indicate fairly well settled output as there was only one small completion during the last week. At present, therefore, Muskegon wells are dropping at the gradual rate of about 300 bbls. a day, or 2,000 bbls. a week.

CANADIAN FIELDS

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is the first approach to commercial production.

South Turner Valley

In the south Turner Valley, Northwest-Associated's No. 1, LSD 6, Section 20-19-2w5, is in the lime at 5,410 feet. The well blew in with 27,000,000 feet of wet gas, and is unofficially reported to have made as high as 1,000 bbls. of crude naphtha in 24 hours, though actual recovery with one separator in the first 24 hours was around 300 bbls. A settled production between 700 and 800 bbls. is thought probable. The well reached a depth of 220 feet in the lime and finished with a bit and some drill rods in the hole, but the wet gas is apparently coming from above the lost tools. The well blew into production while the drillers were removing the mud preparatory to putting in a smaller whipstock to sidetrack the tools, the gas pressure clearing the hole of 3,500 feet of mud. The test was drilled by Imperial Oil, Ltd., on an 80-acre tract held by Associated Oil & Gas Co., Imperial's contract calling for No. 1 test to be carried to at least 4,500 feet, with the privilege of drilling four additional wells. No. 2 will be started at once in the same LSD. After producing for some days No. 1 froze for a 12-hour period, after which it returned to full production.

Of the other tests of the Imperial group in the south Turner Valley, Mayland Oil Co.'s No. 1, LSD 10, Section 17-19-2w5, is drilling 185 feet in the lime at 5,625 feet. A heavy wet gas flow, met at around 5,550 feet, has been mudded off to carry the test deeper, but it looks like at least a fair commercial producer, and materially extends the south producing area. Still further south, Foothills Oil & Gas Co.'s No. 3 (South West Petroleums), LSD 16, Section 8-19-2w5, has got the Madison limestone at 5,478 feet.

Home Oil Co.'s No. 1, LSD 10, Section 20-19-2w5, which has been partly or entirely frozen off for some time, has blown back into production. The well started with a flush production of 40,000,000 feet a day and around 1,000 bbls. crude naphtha recovery, but this represents accumulation and the normal settled production of around 700 bbls. is expected. No drilling was required, the hole clearing when hot oil was circulated. Lowery Petroleum's No. 2 has been tentatively located in SE Section 9-19-2w5. Advance Oil Co.'s No. 5-A, LSD 16, Section 19-19-2w5, is reported spudded in.

Royalite Operations

In the central section, Royalite Oil Co.'s No. 23, NW Section 31-19-2w5, is reported at 4,827 feet after getting the deep lime at 4,820, and preparing to cement 6¼-inch casing in the top of the lime. Royalite's No. 6, LSD 16, Section 31-10-2w5, is standing cemented at 4,539 feet. Royalite's No. 12, LSD 3, Section 13-20-3w5, is drilling at 5,372 feet. Royalite's No. 16, LSD 2, Section 12-20-3w5, is at 5,384 feet and drilling. Royalite's No. 19, LSD 5, Section 6-20-2w5, is setting whipstock at 4,623 feet. Royalite's No. 21, LSD 1, Section 13-20-3w5, is standing cemented in the lime at 4,448 feet. Dalhousie Oil Co.'s No. 7, LSD 11, Section 18-20-2w5, is at 3,397 feet and drilling.

Foothills Oil & Gas Co.'s No. 2, LSD 8, Section 1-20-3w5, is at 4,720 feet and producing from the lime.

Home Oil Co. has applied to the Dominion government for incorporation of a

new company with a capitalization of 10,000,000 no par shares, to facilitate the splitting of the present stock on a 6-to-1 basis. Royalite Oil Co. has applied for authority to increase its capital from 400,000 to 500,000 no par shares, the new stock being sold to present shareholders at $30 a share.

Royalite Oil Co.'s No. 14, LSD 4, Section 7-20-2w5, which got production in the lime at 3,656 feet, is reported to show a considerable increase in wet gas production. This well got the lime at a record high point, 3,220 feet, but production was disappointingly small.

Aerolite Oil Corp.'s No. 1, LSD 4, Section 3-19-2w5, is rigging up.

Mill City Petroleums' Nos. 2 and 3, LSD 14, Section 4-19-2w5, are being located.

In the extreme south, Merland Oils' No. 1, Section 27-18-2w5, is drilling at 3,400 feet, after getting the Dakotas at 3,110. This is the southernmost test now drilling in the Turner Valley Field.

East Crest Oil Co.'s No. 1, LSD 5-6, Section 16-19-2w5, is standing cemented in the lime at 4,322 feet. The test got the top of the Madison at 4 312 feet, approximately 1,000 feet higher than the Home wells, which are a mile north and slightly west, and similarly located on the structure. It is now the most southerly test drilling in the limestone. East Crest's No. 2, LSD 4, same section, is drilling at 2,675 feet, after getting gas and oil shows at 2,270, and logging somewhat higher than No. 1. The latter will probably be finished with a diamond drill outfit. Homestead Oils' No. 1, LSD 5, same section, is now making new hole at 3,548 feet after replacing burned derrick.

New Tests

Askalta Oils' No. 1, LSD 16, Section 5-19-2w5, is digging cellar and working on derrick to spud in by November 25. The officers are: President, James Lyons, Sault Ste. Marie, Ontario; vice president, George MacNamara, Toronto; managing director, W. C. Fisher, Calgary; directors, Thomas Simpson, Sault Ste. Marie; T. W. McKee, Calgary.

Alberta Superior Oils, Ltd., has let the contract to John P. Phillips Co. of Calgary for its No. 1 well in LSD 5, Section 21-19-2w5, test to spud in about October 15. The location is not far from the Home Oil Co. acreage. Standard tools will be used.

In Central Turner Valley

McLeod's No. 4, LSD 16, Section 1-20-3w5, is on production at 5,235 feet. Sioux City Oils' No. 1, LSD 10, is drilling at 2,250 feet after encountering a show of gas at 2,100 feet.

Sentinel Oil Co.'s No. 1, Section 8-20-2w5, is reported drilling at 5,400 feet after running 8¼-inch casing to 5,280. A show of crude was struck at 4,870 feet, some gas at 5,270 feet and more oil and gas shows at 5,350 feet.

Work is being resumed on Vulcan Oils' No. 1, LSD 11, Section 13-20-3w5. This was one of the early deep lime producers in the north part of the central Turner Valley, and got a crude naphtha recovery around 100 bbls. a day from the deep lime at 5,004 feet with a string of tools in the hole. The well was troubled with freezing, and latterly has been making 10 to 15 bbls. a day or less. A shot has been put in to loosen the tools and efforts will be made to finish or sidetrack them in order to drill deeper.

In the north Turner Valley, Spooner Oils' No. 3, Section 24-20-3w5, ic reported drilling. Madison Oils' No. 3, LSD 7, same section, has derrick and camp buildings finished and is installing machinery. United Oils' No. 4, LSD 2, same section, is reported cleaning out preparatory to testing production from the Dalhousie sand at 5,385 feet. It has been flowing light crude by heads. United's No. 5 is being started 250 feet northeast of No. 4.

Model Oils' No. 1, LSD 8, Section 22-20-3w5, is at 5,325 feet, underreaming and lowering 8¼-inch casing, preparatory to drilling into the Dalhousie sands. Anaconda Oil Co.'s No. 1, LSD 16, same section, is drilling in the lower Bentons at 1,190 feet. This test got the Cardium sandstone marker at 320 feet, 850 feet higher than any other well in the vicinity and is apparently at a high point on the structure. This company was organized during the 1926 boom, when it leased 40 acres close to the Home Oil Co. holdings, where a tentative location was made. No drilling was done, and after Home Oil Co.'s No. 1 got its big production, the Anaconda subleased its southern acreage to Baltac Oils, Ltd. The Anaconda then secured 1,000 acres in Township 18-2w5, in the extreme south end of the Turner Valley, and its present acreage in the north end, where No. 1 was started.

Vanguard Oils' No. 1, Section 34-19-3w5, has derrick up. Shasta Oils' No. 1, LSD 4, same section, is working on derrick for a new test.

Turner Valley Production

Figures of the Turner Valley production show, for the 8-months period ending August 31, 1929, aggregate deliveries of 572,777 bbls. August production amounted to 97,053 bbls., representing a daily average for the month of 3,130 bbls. For the 8-months period the daily average amounted to 2,357 bbls.

Among the producing wells, Home Oil Co.'s No. 1 showed the largest aggregate output, amounting to 132,240 bbls. of naphtha and light crude. Royalite Oil Co.'s No. 4 came second with 108,995 bbls. of naphtha. Okalta Oils' No. 1 produced 42,997 bbls. of light crude and Home's No. 2 delivered 40,223 bbls. of naphtha and crude, both being in production only a part of the period.

Cameron Petroleums' No. 1, LSD 8, Section 36-20-3w5, is rigging up.

In the Highwood-Sinclair district, Imperial Oils' Highwood No. 1, LSD 3, Section 36-18-3w5, has been definitely abandoned after drilling to around 4,514 feet. At this depth the drill was still in the fault plane where the Fernie shales recurred after drilling a considerable distance in the lime. The drilling indicated the test was unfavorably located on the structure, and it is reported Imperial's Highwood No. 2 is rigging up with standard tools on a new location in Section 21-19-3w5, to spud in early this month. Warner Oils' No. 3, LSD 4, Section 28-18-3w5, is rigged up ready to spud in; this is an offset to No. 2 which was abandoned owing to drilling difficulties. Hudson's Bay-Marland Oil Co.'s Highwood No. 1 is at 805 feet and drilling.

In the Waite Valley area, Calgary Development & Producing Corp.'s No. 1, LSD 10, Section 21-19-3w5, is drilling below 171 feet. Anglo-Pacific Oils, Ltd., has located its No. 1 close to this test and is hauling materials. Bonanza Oils' No. 1 LSD 4, Section 14-19-3w5, is letting contract for camp buildings and derrick. Sharron Oils' No. 1, LSD 7, Section 5-20-3w5, has derrick up and is reported drilling water well. Innerfold Oils' No. 1, LSD 2, Section 6-20-3w5, is drilling at 1,875 feet with small shows of gas in the Dakotas.

In the new Black Diamond area, Cartier Oils, Ltd., has made tentative location for its No. 1 test in Section 4 or 5, Township 19-3w5. Actual well site will be selected by Geologist Stanley J. Davies. The same company is planning to drill No. 2 in the Monarch area, near Olds.

Embassy Oil & Gas, Ltd., of Winnipeg, is planning to start core drilling operations in the north-central section of the Turner Valley Field, to definitely locate the fault lines preparatory to locating a commercial test. The company has 80 acres in LSD 10 and 15, Section 3-21-3w5. Officers are: President, F. J. Sharpe, Winnipeg; vice president, Walter F. Thorne, Moose Jaw; secretary-treasurer, James Kerr, Winnipeg; directors, Charles F. Gray, J. H. G. Russell, A. E. Quinton, C. R. Sayes, Dr. E. S. Moorehead, Joseph Halprin, all of Winnipeg; managing director, H. V. O'Reilly, Calgary.

Moose Mountain

In the Moose Mountain district, Elbow Oils' No. 1, LSD 11, Section 35-22-5w5, is at 2,625 feet and drilling after encountering slight shows of oil and gas.

In the Morley Reserve area, Norcon Oil Co.'s No. 1 got the McDougall-Segur sands at 1,530 feet with a strong gas flow indicated; 10-inch casing is being run to the top of the sands to shut off water just above the gas vein.

In the Skiff Field, Dauntless Oils' No. 1, LSD 9, Section 36-6-15w4, is drilling below the Sunburst sands at 3,140 feet. The drill penetrated 30 feet of oil saturated sand in the Sunburst, but the test will be carried to the Ellis.

In the Milk River district, Capitol Oil & Gas Co.'s No. 1-A, LSD 16, Section 32-1-12w4, is drilling 8¼-inch hole in the lower Sunburst sands at 2,130 feet. Some gas has been cemented off. At 250 feet a small gas show was met and cased off, and more gas encountered between 920 and 962 feet. At 1,433 feet a third gas horizon was encountered, but no measurement of flow or pressure was taken.

In the area between Lethbridge and the Blood Reserve, Lethbridge Petroleum & Refineries, Ltd., has finished the first of a series of core drill tests. The core drilling will be completed this month, when a commercial test may be started.

In the Chin area, the unfinished Lethalta Oils' No. 1 at Chin Coulee will be completed by Chinalta Petroleums, Ltd.

In the Acadia Valley, Fuego Oils' No. 1, Section 34-25-4w4, is being drilled deeper. This test got a strong gas flow at 3,125 feet, followed by salt water and heavy asphaltic crude. Later both oil and gas pinched out, leaving about 2,000 feet of oil and water standing in the hole. It was claimed the well had bridged, and it is now unofficially reported that 10 feet additional drilling got a second show of lighter crude.

In the Lomond district, Hudson's Bay-Marland Oil Co.'s Lomond No. 1, Section 23-17-18w4, is reported underreaming at 750 feet. The same company is reported to have let the contract for a series of 400-foot structure tests 7½ miles south of Galahad. One of these is located in SE Section 34-39-14w4, and another 2 miles further south. Shows of oil and gas seepages along the Paint Earth Creek have been known for some years. The Galahad area is west of Ribstone and southwest of Wainwright.

Cypress Hills

In the Cypress Hills Field near Medicine Hat, Eagle Butte Oil Co.'s No. 1 quit drilling at 4,002 feet after encountering water. The test last fall got a heavy gas flow at 3,340 feet and was carried deeper for oil, and apparently got the water rim of the structure. Work is being started on Eagle Butte's No. 2, which is bing located 2 miles from No. 1, and considerably higher on the structure.

In the Taber district, Cole-English Syndicate's Taber No. 1, LSD 3, Section 11-10-17w4, has resumed drilling after cementing 18-inch casing around 100 feet. A heavy-duty rotary outfit is being used, and has been piped from the Bow Island-Calgary line for fuel. A crew of 25 men is at work, in three shifts.

An organization financed largely by Montreal capital and headed by James Ryan is preparing to test a new structure in eastern Alberta 12 miles south of Empress and close to the Saskatchewan border. The area was surveyed six years ago by Dr. C. C. Coulter and later the structures were blanketed by Range Oil & Gas Co. of Calgary. The Ryan interests have acquired 5 500 acres of leases from the Range company. The nearest development in recent years has been southwest at Many Island Lakes, northwest at Oyen and east at Outlook, Saskatchewan. Gas has been struck in the Many Island Lake and Oyen districts, and 10 years ago a community well at Empress is reported to have got a show of wet gas.

In the Wainwright Field, east-central Alberta, Beaumont Oils' No. 1, Section 2-45-7w4, is being placed on the pump. Beaumont's No. 2, LSD 10, Section 30-45-7w4, is rigged up for a deep test and laying gas line to Fabyan Petroleums' No. 2 gasser. Bethwain Oils' No. 1, Section 6-45-6w4, is reported coring in a sandstone formation at 2,272 feet close to the oil sand. Fabyan Petroleums' No. 3, Section 18-45-8w4, is moving in derrick material.

Grenadier Oils, Ltd., a new organization, has located its No. 1 test in LSD 10, Section 30-45-7w4. Maple Leaf Oil & Gas Co.'s No. 2, LSD 1, Section 24-45-8w4, is at 1,780 feet and drilling into the gas sand, after cementing. Peninsular Petroleums' No. 1, LSD 16, Section 30-45-6w4, had derrick and camp completed. Wainwell Oils' No. 4, LSD 15, Section 36-44-7w4, is pumping from the sand at 2,051 feet and making around 50 bbls. a day.

Toralto Oils, Ltd., of Toronto, which has considerable acreage in the Wainwright Field, is taking over the Anwood-Dome Co., a merger of the Anwood Oil Co. and Wainwright Dome Oils, Ltd. Anwood-Dome's No. 1, LSD 7, Section 21-45-6w4, will become Toralto-Dome's No. 1. It is in the oil sand at 2,275 feet but owing to water troubles has not been put into production. Toralto-Dome's No. 2, LSD 5, Section 16-44-6w4, has rotary derrick erected.

In the Ribstone Field, Oxville Oil, Gas & Development Co.'s No. 1, Section 10-45-2w4, has spudded in. The location is south of Lloydminster and close to the interprovincial boundary.

In Section 14-45-5w4, Weymarn Petroleums, Ltd., has finished two out of six core drill tests and is working on a third.

In British Columbia the Crow's Nest-Glacier Oil Co.'s No. 1, Sage Creek Field, is reported bailing light crude and looks like a commercial producer. Crow's Nest-Glacier's No. 2 has been located 530 feet west of No. 1 and materials are being moved in. Majestic Oil Co.'s No. 1 is working on derrick.

Ontario Fields

In the Ontario Fields, official figures issued by the Dominion Bureau of Statistics show for the first six months of 1929 a steady decline in the crude oil production of the old Ontario fields. For the major pools the figures are as follows:

	1928 Bbls.	1929 Bbls.
Petrolia-Enniskillen	31,684	27,502
Oil Springs	16,915	14,760
Bothwell	12,602	12,248

This represents a reduction of 4,182, bbls. in Petrolia, 2,245 in Oil Springs and 354 in Bothwell as against the six-months period last year. Production for the last six months may show a slight improvement, but the year's production for these three pools will likely run between 110,000 and 115,000 bbls.

In Lambton County, Union Natural Gas Co.'s No. 42 in Euphemia Township, is reported drilling around 2,000 feet with a small show of gas.

In Dover Township, Kent County, Ajax Oil & Gas Co.'s No. 6 is spudding in south and east of No. 4 producer. Acme Oil & Gas Co.'s No. 1 is reported to have got a small show of gas about 60 feet in the Trenton limestone and will finish in a few days. Olga Oil & Gas Co.'s No. 1 John Jubenville farm, is rigging up, and No. 2, Bruce Bradley farm, is starting to rig up.

In northern Ontario, the James Bay Basin Oil Co. is starting work on the Grey Goose Islands. No. 1 well has started drilling, and equipment and supplies are on hand for continuous work.

MAPS OF TEXAS COUNTIES

J. Ray Stebbins of the Stebbins Oil & Gasoline Co., Tulsa, spent several days of the past week in Fort Worth, Tex., on business pertaining to the recapitalizing of the Logan Map Co. and purchasing a half interest in the same from W. W. Zingery.

The Logan Map Co. now has maps covering 115 West Texas counties, and also maps on the Panhandle, Wichita Falls and Ranger districts, and is working on maps covering 50 counties in East Texas. It is also making a combination map covering 78 West Texas counties and the eastern part of New Mexico. The maps show fee and lease ownerships and production data with the pools.

R. T. Logan has been in charge of the Logan Map Co. in Fort Worth for over two years, and before that time had offices for his company at Cisco, Tex.

LOUISIANA-ARKANSAS PROVEN AREAS

(Continued from Page 70)

Ray-Dawes Drlg. Co.'s No. 4 Hunter, 990 ft. N, 330 ft. E, SW cor., Sec. 9-19-14 ..... Derrick.
Standard Oil Co.'s No. 3 Henderson, 220 f.. N. 330 ft. W, SE cor. SW SE, Sec. 7-19-14 ..... Derrick.
Standard Oil Co.'s No. 9 Hunter, 330 ft. N, 330 ft. W, SE cor. SW SE, Sec. 8-19-14 ..... Began drlg. Oct. 1; drlg. 50 ft.
The Texas Co.'s No. 2 Hunter, 272 ft. N, 272 ft. W, SE cor. SW, Sec. 9-19-14 ..... Cmtd. 6-in. 2,400 ft.
The Texas Co.'s No. 3 Hunter, 990 ft. W, 330 ft. N, SE cor., Sec. 8-19-14 ..... Began drlg. Sept. 26; cmtd. 10-in. 108 ft; 6-in. 2,400 ft.
The Texas Co.'s No. 4 Hunter, 990 ft. N, 330 ft. W, SE cor. Sec. 8-19-14 ..... Rigging up.
The Texas Co.'s No. 5 Hunter, 990 ft. N, 272 ft. W, SE cor. Sec. 9-19-14 ..... Derrick.

CADDO PARISH—OIL CITY

Arrow Synd.'s No. 1 Pender, 200 ft. N, 440 ft. E, SW cor., NW NW, Sec. 11-20-15 ..... Rigging up.
W. D. Chew's No. 5 fee, Sec. 33-21-16 ..... Tested S.W. show of oil; W.O. 2,306 ft.
Gulf Ref. Co.'s No. 19-A Levee Board, 700 ft. E, 220 ft. S, NW cor. NE, Sec. 34-21-16 ..... W.O.S.R; 1,825 ft.
Magnolia Pet. Co.'s No. 4 Levee Board, 330 ft. S, 330 ft. E, NW cor. NE NE, Sec. 7-20-15 ..... Cmtd. 8⅛-in. 2,265 ft; bailing to tes .
Shreveport Oil Corp.'s No. 1 Guy, NW NE, Sec. 32-21-15 .. Tested S.W. with show of oil; S.D. for orders; T.D. 2,300 ft.
Simplex Oil Co.'s No. 7 Youree-Randolph, 660 f.. N, 660 ft. W, C, Sec. 13-20-15 ..... Tested 50,000 ft. gas 2,300 ft; S.D. for orders; T.D. 2,326 ft.
The Texas Co.'s No. 72 Levee Board, 725 ft. N, 210 ft. E, SW cor. SE, Sec. 27-21-16 ..... Rigging up.

CADDO PARISH—HOSSTON

Standish O. & R. Co.'s No. 12 Allen, 1,120 ft. W, [illegible] ft. S, C, Sec. 23-22-15 ..... S.D.; W.O. 1,066 ft.

CADDO PARISH—LEWIS

Snake Creek Oil Co.'s No. 1 Levee Board, SW NW, Sec. 9-21-16 ..... Tested dry with show of oil and S.W.; S.D.; T.D. 2,328 ft.

CADDO PARISH—PINE ISLAND

C H. French's No. 7 Muslow, NE SE, Sec. 31-21-15 ..... Drlg. 1,275 ft.

CLAIBORNE PARISH HOMER

Oakes et als' No. 1 Richardson, NE SE, Sec. 19-21-7 .... S.D. 1,112 ft; in litigation.

LASALLE PARISH—URANIA

Air Lift Oil Co.'s No. 8 Urania, Sec. 18-10-2e ..... Began drlg. Sept. 28; 10-in. 100 ft; drlg. 400 ft.
Kinney, Hard ner & Randall's No. 1 Kinney, SW SW, Sec. 7-10-2e ..... S.D. 1,570 ft.
Philp et als' No. 1 Urania, SE cor. NE NE, Sec. 1-10-1e .. Tested 500,000 ft. gas and sanded up; C.O.; setting liner to test; T.D. 700 ft.
Randall et als' No. 3 Urania, Sec. 1-10-1e ..... S.D. 675 ft.
Trio Oil Co.'s No. 2 Urania, NE cor. SW SW NW, Sec. 19-10-1e ..... Derrick.

MOREHOUSE PARISH

Bahan & Bahan's No. 1 Feazel, 330 ft. S, 200 ft. W, NE cor., Sec. 3-20-4 ..... Derrick.
J. S. Herkness' No. 9 Bowles, 506 f.. S, 1,980 ft. E, NW cor., Sec. 17-20-3 ..... Cmtd. 6-in. 2,208 ft.
J. S. Herkness' No. 10 Bowles, 1,914 ft. N, 528 ft. W, SE cor. SW, Sec. 17-20-5 ..... Drlg. gumbo 1,150 ft.
J. S. Herkness' No. 11 Bowles, 4,620 ft. S, 1,980 ft. E, NW cor. Sec. 18-20-5 ..... Location.
J. S. Herkness' No. 12 Bowles, 3,392 ft. E, 3,300 ft. S, NW cor. Sec. 18-20-5 ..... Location.
Magnolia Pet. Co.'s No. 5 U. S., 620 ft. N, 330 ft. W, SE cor. NE SW, Sec. 29-21-5 ..... Estimated 5,000,000 ft. gas; drill stem stuck; sidetracking; T.D. 2,363 ft.
Southern Carbon Co.'s No. 12 Tensas, 660, ft. S, 660 ft. E, NW cor., Sec. 2-20-4 ..... Drlg. gumbo 1,130 ft.
United Carbon Co.'s No. 2 Patton, 660 ft. N, 660 ft. E, SW cor. SE, Sec. 2-20-4 ..... Location.
United Carbon Co.'s No. 3 Patton, 660 ft. W, 660 ft. S, NE cor. SE, Sec. 2-20-4 ..... Location.

OUACHITA PARISH

Amalgamated Carbon Co.'s No. 2 Cole, 742 f.. E, 703 ft. S, NW cor., Sec. 43-19-4 ..... Location.
Amalgamated Carbon Co.'s No. 3 Cole, 1,616 ft. E, 721 ft. S, NW cor., Sec. 42-19-4 ..... Rigging up.
Ark.-La. P. L. Co.'s No. 3 Rea & Green, 1,526 ft. W, 1,350 ft. S, NE cor., Sec. 11, in Sec. 82-18-4 ..... Began drlg. Oct. 1.
Austin & Jordan's No. 1 Chauvin, 110 ft. E, 329 ft. S, most northerly cor., Sec. 62-18-3 ..... Began drlg. Sept. 21; cmtd. 12-in. 184 ft; 8-in. 810 ft; 6-in. 2,178 ft.
Austin & Jordan's No. 2 Wall, Sec. 11-18-3 ..... Began drlg. Sept. 12; cmtd. 12-in. 184 ft; 8-in. 815 ft; 6-in. 2,178 ft.
Chauvin Gas Co.'s No. 1 W. Va., 598 ft. E, 147 ft. S, NE cor., Sec. 46, in Sec. 8-18-4 ..... Began drlg. Sept. 21; cmtd. 12-in. 188 ft.
Hope Producing Co.'s No. 1 Fairbanks, 660 ft. N, 624 ft. E, SW cor. SE, Sec. 25-20-4 ..... Location.
Hope Producing Co.'s No. 2 Fairbanks, 1,876 ft. E, 628 ft. N, SW cor. SE, Sec. 25-20-4 ..... Location.
Hope Producing Co.'s No. 3 Fairbanks, 1,876 ft. E, 628 ft. S, NW cor. NE, Sec. 36-20-4 ..... Location.
Imperial O. & G. Products Co.'s No. 10 Stubbs, 2,403 f.. W, 395 ft. N, common cor. Secs. 12, 13 and 45, in Sec. 12-19-13 ..... Cmtd. 8¼-in. 742 ft.
G. E. Jordan's No. 1 Anding, NW NE, Sec. 18-18-5 ..... Plugged back to 2,234 ft; T.D. 2,480 ft.
Jordan Drlg. Co.'s No. 5 Cole, 680 ft. S, 602 ft. W, common cor. Secs. 1, 2 and 35, in Sec. 35-18-3 ..... Began drlg. Sept. 28; cmtd. 12½-in. 180 ft.
Mack & Pipes' No. 2 Flagle-Johnson, 446 ft. S, 649 ft. W, northwesterly cor., Sec. 47, in Sec. 48-18-4 ..... Location.
Mack & Pipes' No. 3 Slagle-Johnson, 642 ft. S, 530 ft. W. northeasterly cor., Sec. 47, in Sec. 47-18-4 ..... Began drlg. Sept. 28; cmtd. 12-in. 192 ft; 8-in. 820 ft.
Magnolia Pet. Co.'s No. 2 fee 401, 660 ft. S, 660 ft. E, NW cor., Sec. 2-18-3 ..... Derrick.
Magnolia Pet. Co.'s No. 3 fee 404, 660 ft. N, 660 ft. E, SW cor., Sec. 11-19-5 ..... Coring 2,103 ft.
Magnolia Pet. Co.'s No. 4 U. S., Sec. 20-19-5; reported completed July 31, in error ..... Tested 1,000,000 ft. gas at 515 lbs. rock pressure; set liner 2,528 ft; bailed dry; plugged back to 2,290 f.; arranging to test.
Palmer Corp.'s No. 1 Cagle, 1,964 ft. S, 476 ft. E, NW cor., Sec. 7-18-5 ..... Rigging up.
J. E. Sandridge, Jr.'s No. 1 W. E. Montgomery, 568 ft. N, 410 ft. E, SW cor., Sec. 18-18-5 ..... Began drlg. Sept. 28; cmtd. 8-in. (first string) 100 ft; 6-in. 750 ft.
Southern Carbon Co.'s No. 54 fee, 660 ft. N, 674 ft. W, SE cor. NE, Sec. 13-19-4 ..... T.A. 2,385 ft.
Southern Carbon Co.'s No. 4 Phillips, 660 ft. S, 660 ft. E, NW cor., Sec. 8-19-4 ..... Rigging up.
Stubbs, trustee's No. 1 Linton Stubbs, 203 ft. E, 121 ft. S, Sec. 19-19-4 ..... Drlg. 1,452 ft.
Trousdale & Wright's No. 1 Kate Cole, 296 f.. S, 47 ft. W, common cor. Secs. 8, 9 and 42 in Sec. 42-18-4 .... Location.
United Oil & Nat. Gas Products Co. of La.'s No. 5 Guthrie, 6,896 ft. N, 6,022 ft. W, cor. Secs. 49, 26, and 25, Sec. 49-20-5 ..... Derrick.
United Oil & Nat. Gas Products Co. of La.'s No. 2 Cole, 660 ft. S, 594 ft. E, C, Sec. 26-20-4 ..... Derrick.

RED RIVER PARISH

Joe Danciger et als' No. 1 Pickett, 6,621 ft. S, 2,623 ft. W, NE cor., Sec. 15-13-11, in Sec. 23-13-11 ..... C.O. 2,400 ft; T.D. 2,555 ft.
Root Refineries, Inc.'s No. 1 Home State & Savings Bank, 330 ft. N, 330 ft. W, C, Sec. 8-13-10 ..... Oil show 2,570 ft; drill stem test; S.W; cored sand showing gas 2,598 ft; S.D. 2,667 ft.
Triple Oil Co.'s No. 1 W. M. Pollock, Sec. 33-13-11 ..... Began drlg. Sept. 26; cmtd. 10-in. 102 f..; drlg. 769 ft.

RICHLAND PARISH

Ark.-La. P. L. Co.'s No 1 Chenault, 1,980 ft. W, NW, C, SE SE, Sec. 2-16-6 ..... Derrick.
W. C. Feazel's No. 1 Brown, 2,800 ft. W, 1,760 ft. S, NE cor., Sec. 27-16-6 ..... Cmtd. 6-in. 2,279 ft.
W. C. Feazel's No. 2 Brown, 1,940 ft. W, 185 ft. N, SE cor. Sec. 22-16-6 ..... Location.
Feazel, Bendel & Brown's No. 1 J. H. Hemler, 660 ft. S, 660 ft. W, NE cor. NW, Sec. 23-16-6 ..... Drlg. gumbo 1,240 ft.
Hope Prod. Co.'s No. 1 J. H. Hemler, 660 ft. S, 660 ft. W, NE cor., Sec. 11-16-6 ..... Fishing drill collar and bit.; T.D. 1,990 ft.
Hope Prod. Co.'s No. 1 Thomason, 3,366 ft. W, 660 ft. S, NE cor., Sec. 11-16-6 ..... Began drlg. Sept. 28; cmtd. 12¼-in. 192 ft.
Magnolia Pet. Co.'s No. 2 Hatch, 180 ft. N, 660 ft. W, SE cor. NE SE, Sec. 2-15-5 ..... Tested dry 2,390 ft; arranging to deepen.
Magnolia Pet. Co.'s No. 4 C. M. Noble, 400 ft. S, 660 ft. W, NE cor. SE NE, Sec. 35-16-5 ..... Location.
Magnolia Pet. Co.'s No. 1 B. F. Sartor, 1,087 ft. W, 737 f.. N, C, Sec. 17-16-6 ..... Estimated 10,000,000 ft. gas 2,382 ft; drilled to 2,416 ft; arranging to deepen.
M. L. Meredith's No. 1 Holdness, 1,980 ft. S, 990 ft. W, NE cor., Sec. 15-16-6 ..... Rigging up.
Northern La. Nat. Gas Co.'s No. 4 Boykin, Sec. 20-17-14. Drlg. shale and boulders 1,892 ft.
Palmer Corp.'s No. 2 Earle, 1,980 ft. N, 1,320 ft. W, SE cor., Sec. 31-17-6 ..... Derrick.
Palmer Corp.'s No. 1 Eubanks, 1,100 ft. N, 350 ft. E, SW cor. SE NW, Sec. 26-17-6 ..... Drlg. packed sand 1,630 ft.
Palmer Corp.'s No. 1 La. Pet. Co., Sec. 22-17-6 ..... Tested estimated 2,000,000 ft. gas; cmtd. 4¾-in. 2,375 ft; T.D. 2,478 ft.
Palmer Corp.'s No. 4 Marshfield, 1,980 ft. E, 1,320 ft. N, SW cor. SW, Sec. 20-17-6 ..... Drlg. lime 2,430 ft.
Palmer Corp.'s No. 1 Mulhern, 660 ft. S, 1,320 ft. W, NE cor. NE, Sec. 29-17-6 ..... Drlg. shale and boulders 2,322 ft.
Palmer Corp.'s No. 4 Rhymes, 660 ft. S, 1,320 ft. W, NE cor. NW, Sec. 28-17-6 ..... Tested dry 2,430 ft; arranging to deepen.
Southern Carbon Co.'s No. 1 Binion & Sartor, 660 f.. N, 1,320 ft. E, SW cor. SE, Sec. 21-17-6 ..... Cmtd. 6-in. csg. 2,273 ft.
United Carbon Co.'s No. 1 Thornby, 660 ft. W, 650 ft. N, SE cor. NW NE, Sec. 12-16-6 ..... Cmtd. 6-in. 2,280 ft.

SABINE PARISH—PLEASANT HILL

Ark. Fuel Oil Co.'s No. 2 Horne, 860 ft. N, 300 ft. E, SW cor. SE SW, Sec. 33-10-12 ..... Cmtd. 6⅝-in. csg. 3,150 ft.
Bridges-Clark Oil Co.'s No. 2 Williams, 2,150 ft. W, 2,000 ft. S, NE cor., Sec. 33-10-12 ..... Rigging up.
Magnolia Pet. Co.'s No. 3 E. E. Hall, 460 ft. N, 200 ft. W, SE cor., Sec. 33-10-12 ..... Bailing to test; T.D. 3,248 ft.
Magnolia Pet. Co.'s No. 4 E. E. Hall, 855 ft. N, 343 ft. W, SE cor. NW SW, Sec. 33-10-12 ..... Location.

UNION PARISH

Bahan & Bahan's No. 1 Bess, 47 ft. S, 64 ft. W, NE cor. NW, Sec. 11-20-3 ..... Location.
Bahan & Bahan's No. 3 Peake, 1,215 f.. S, 100 ft. W, NE cor., Sec. 17-20-4 ..... Began drlg. Sept. 29; cmtd. 12-in. 185 ft; 8-in. 787 ft.
E. S. Hall's No. 2 Spencer, 317 ft. W, 182 ft. S, NE cor. NW SE, Sec. 2-20-3 ..... Location.
Industrial Gas Co.'s No. 1 Jenny, 2,629 ft. N, 657 ft. E, SW cor., Sec. 6-20-4 ..... Drlg. 1,659 ft.
Interstate Nat. Gas Co.'s No. 23 fee, 660 ft. S, 660 ft. E, NW cor. Sec. 33-20-3 ..... Derrick.

WEBSTER PARISH—COTTON VALLEY

La. Oil Ref. Corp.'s No. 9 Gray, 1,980 ft. S, 660 ft. W, NE cor. NW, Sec. 29-21-10 ..... Drlg. lime 4,142 ft.
Magnolia Pet. Co.'s No. 1 McCook & Hibbler, C SW SW, Sec. 22-21-10 ..... First sand; T.D. 6,888 ft; tested 284 joints mud, no showing oil or gas.
Ohio Oil Co.'s No. 45 Bodcaw, 660 ft. N, 600 ft. W, SE cor. SW SW, Sec. 21-21-10 ..... Drlg. 3,100 f..
Palmer Corp.'s No. 1 Sally Coyle, 660 ft. S, 660 ft. W, NE cor. NE SW, Sec. 28-21-10 ..... Cmtd. 6-in. 4,244 ft.
Standard Oil Co.'s No. 3-D Bodcaw, 660 ft. N, 660 ft. E, SW cor. SE NE, Sec. 28-21-10 ..... Drlg. gummy shale 3,707 ft.

WEBSTER PARISH—SAREPTA AND SHONGALOO

J. W. Clark, trustee's No. 1 L. H. Wise, 1,980 ft. E, 660 ft. S, NW cor., Sec. 30-23-9 ..... Began drlg. Sept. 19; cmtd. 10-in. 280 ft; drlg. 1,350 ft.
Pat Hudson's No. 1 L. S. Gardner, 150 ft. E, 200 ft. S, NW cor. SW NE, Sec. 1-22-11 ..... Began drlg. Sept. 27; cmtd. 10-in. 200 ft; drlg. 250 ft.
Pat Hudson's No. 1 Slack, SE NE, Sec. 1-22-9 ..... Standing 1,200 ft. in oil; W.O.S.R; T.D. 2,745 ft.
F. E. Estes' No. 2 Pardee, 1,270 ft. W, 50 ft. S, NE cor. NW, Sec. 3-22-11 ..... Rigging up.
Jacob Larkin, trustee's No. 2 Pardee Co., 1,120 ft. W, 200 ft. S, C, Sec. 3-22-11 ..... Location.
Magnolia Pet. Co.'s No. 1 C. V. Bailey, 100 ft. N, 660 ft. E, SW cor. NW NE, Sec. 29-23-9 ..... O.W.D.D; drlg. gray sand 2,774 ft.
Magnolia Pet. Co.'s No. 1 N. T. Knight, 330 ft. S, 330 ft. E, NW cor. SE SE, Sec. 33-23-9 ..... Bailing 8⅛-in.; T.D. 2,674 ft.
Magnolia Pet. Co.'s No. 2 Scroggins, 330 ft. S, 376 ft. E. NW cor. SW NW, Sec. 1-22-11 ..... Drlg. lime and shale 1,982 ft.
Sarepta Oil Co.'s No. 1 L. S. Gardner, 300 ft. S, 300 f.. W, C, Sec. 1-22-11 ..... Drlg. 1,510 ft.
Woodmansee et als' No. 1 Boyd, 200 ft. S, 200 ft. E, NW cor. SE SW, Sec. 3-22-11 ..... Derrick.

WINN PARISH—URANIA

Gardner, Hunter & Brown's No. 16 Harper, 330 ft. N, 400 ft. E, SW cor. NW NE, Sec. 26-10-1e ..... W.O.S.R; 1,495 ft.
Thompson Bros.' No. 1 Sanders, 100 ft. S, 100 ft. W, SE cor. W½ NE NE, Sec. 27-10-1e ..... Drlg. rock 1,603 ft.

ARKANSAS

NEVADA COUNTY

C F. Steele's No. 1 E. W. Groves, Sec. 21-14-20 ..... S.D. for wtr; T.D. 2,821 ft.

MOUNT HOLLY

Houston Oil Co.'s No. 1-B Wilson, 150 ft. N, 150 ft. E, SW cor. SW NW, Sec. 25-15-18 ..... Coring 2,756 ft.

OUACHITA COUNTY—SMACKOVER

Ark. Nat. Gas Co.'s No. 1 Avera, 250 ft. N, 200 ft. E, SW cor. SE SW, Sec. 35-15-15 ..... Showed oil; bailed dry; 17-ft. sand 1,984 ft; arranging to deepen.
R. F. Foster's No. 1 Murphy, SW cor. NE SW, Sec. 35-15-16 ..... Cmtd. 6⅝-in. 1,983 ft; arranging to test; T.D. 2,012 ft.
L. H. Hamilton's No. 1 Arnold & Doyle, SE SE, Sec. 23-15-16 ..... Standing 400 ft. in fluid; 23 ft. broken sand; T.D. 2,010 ft.
Magna Prod. Co.'s No. 5-B McKenzie, Sec. 36-15-16 ..... Began drlg. Sept. 25; cmtd. 10-in. 40 ft.; drlg. 200 ft.
Marine Oil Co.'s No. 7-A Hays, Sec. 4-16-15 ..... Began drlg. Sept. 25; cmtd. 10-in. 108 ft.; drlg. 1,700 f..

Oil Field Corp.'s No. 10 McKenzie, 265 ft. E, 185 ft. N, SW cor, SE NE, Sec. 36-15-16 ..... Derrick.
Phillips Pet. Co.'s No. 2 Clayton, 250 ft. N, 250 ft. E, SW cor. NW NE, Sec. 34-15-15 ..... Pumped 40 bbls. first 6 hrs; sanded up; T.D. 2,019 f..
Phillips Pet. Co.'s No. 4 Scott, 250 ft. S, 350 ft. W, NE cor. SW NE, Sec. 34-15-15 ..... W.O.S.R; 500 ft. fluid in hole from 40 ft. broken sand; T.D. 2,024 ft; plugging back to cut off S.W.
J. D. Reynolds' No. 1 fee, SE cor. SE SW, Sec. 27-15-15.. Standing 400 ft. in fluid; 27-ft. sand; W.O.S.R; T.D. 2,047 ft.
J. D. Reynolds' No. 2 fee, 150 ft. N, 150 ft. E, SW cor. SE SW, Sec. 27-15-15 ..... Began drlg. Sept. 26; cmtd. 10-in. 50 ft; drlg. 850 ft.
Shell Pet. Corp.'s No. 5 Williams, 210 ft. S, 260 ft. W, NE cor. NW SE, Sec. 34-15-15 ..... Began drlg. Sept. 26; cmtd. 10-in. 87 ft.
Simms Oil Co.'s No. 3 E. Johnson, 265 ft. E, 300 ft. S, NW cor. NE SE, Sec. 34-15-15 ..... Cmtd. 6⅝-in. 1,959 ft; coring 1,-963 ft.
Simms Oil Co.'s No. 4 Johnson, 330 ft. N, 85 ft. E, SW cor. NE SE ,Sec. 34-15-15 ..... Location.
Skelly Oil Co.'s No. 1 Langley, 250 ft. N, 250 ft. E, SW, cor. NW SW, Sec. 35-15-15 ..... Cmtd. 6-in. 1,972 ft; drlg plug; T.D. 1,979 ft.
Skelly Oil Co.'s No. 4 Woods, 300 ft. E, 200 ft. N, SW cor. NE NE, Sec. 34-15-15 ..... Began drlg. Sept. 29; drlg. 100 ft.
Southern Prod. Co.'s No. 1-A Watts, SW cor. SW SE, Sec. 27-15-15 ..... Derrick.
Standard Oil Co.'s No. 13 Arnold, 200 ft. S, 200 ft. E. NW cor. NE NE, Sec. 26-15-16 ..... Location.
Standard Oil Co.'s No. 8 Powell, 200 ft. S, 200 ft. W. NE cor. SE NW, Sec. 34-15-15 ..... Drlg. gumbo 1,290 ft.
J. D. Wingfield's No. 1 Martin, SW cor., Sec. 26-15-15 .. S.D. repairing rig 1,600 ft.

UNION COUNTY—CHAMPAGNOLLE

Gann et als' No. 1 Doss, Sec. 10-17-15 ..... Tested S.W. 2,900 ft; W.O.; T.D. 3,240 ft.
Magnolia Pet. Co.'s No. 1 Schmidt, 300 ft. N, 300 ft. W, SE cor. NW SW, Sec. 5-17-14 ..... Tested 15,000,000 ft. dry gas 2,-708-15 ft; setting 8⅛-in. 2,-708 ft.
Rovenger Oil Corp.'s No. 3-B Perdue, 330 ft. S. 330 ft. W, NE cor. SE NE, Sec. 9-17-15 ..... 400 ft. fluid in hole; W.O.S.R; T. D. 3,280 f..

UNION COUNTY—EL DORADO

J. P. Hawkins' No. 1 Goodwin, Sec. 3-17-15 ..... S.D. 2,575 ft; W.O.
Rice et als' No. 1 W. Raitey, 150 ft. S, 150 ft. E, NW cor. SW, Sec. 7-17-15 ..... Spudded July 18; cmtd. 10-in. at 92 ft.
Standard Oil Co.'s No. 6 Goodwin, Sec. 36-17-16 ..... Bailed csg. dry 1,700 ft; T.D. 2,-176 ft.

UNION COUNTY—SMACKOVER

Ark. Fuel Oil Co.'s No. 5 Alphin, Sec. 11-16-16 ..... O.W.D.D.; arranging to pump 1,960-70 ft.
E. L. Chapman's No. 1 Purifoy, 585 ft. W, 150 ft. S, NE cor. NW SW, Sec. 2-16-16 ..... Completed Aug. 7, 1929; production 15 bbls; 150-ft. sand; tested S.W. 2,337 ft; W.O.
E. L. Chapman's No. 2 Purifoy, Sec. 2-16-16 ..... Plug back to 2,316 ft; tested S.W. 2,350 ft; cmtd. bottom; T.D. 2,-385 ft.
Foster et als' No. 1 J. V. Spohr, 330 ft. S, 330 ft. W, NE cor. SE SW, Sec. 35-15-16 ..... Derrick.
E. M. Jones' No. 1 H. Murphy, 211 ft. S, 211 ft. E, NW cor. Lot 3, NW, Sec. 2-16-15 ..... W.O.S.R; 90 ft. fluid in hole from 17 ft. broken sand; T.D. 1,-981 ft.
E. M. Jones' No. 2 H. Murphy, 200 ft. E, CWL, Lot 1, NE, Sec. 2-16-15 ..... Began drlg. Sept. 26; cmtd. 10-in. 150 ft; drlg. 1,720 ft.
Lion Oil Ref. Co.'s No. 1 James, CWL, Lot 2, NW, Sec. 6-16-15 ..... Rigging up.
Joe Marr's No. 2 Goodwin, 150 ft. E, 250 ft. N, SW cor., Sec. 3-16-16 ..... S.D. 2,470 ft.
J. D. Reynolds' No. 1 fee, SE cor. SE SW, Sec. 27-15-15.. Rigging up.
Shell Pet. Co.'s No. 1 Carroll, 1,320 ft. W, 330 ft. N, SE cor. NE SW, Sec. 19-18-16 ..... Rigging up.

EAST TEXAS
PANOLA COUNTY

Eureka Nat. Gas Co.'s No. 1 Jeter, 300 ft. S, 300 ft. W, NE cor. John Womack Sur. ..... Drlg. 2,200 ft.
S. H. Gardner's No. 5 Brumble, 5,966 f.. E, 4,132 ft. S. NW cor. B. C. Jordan Sur. ..... Began drlg. Sept. 25; cmtd. 10-in. 42 ft.; drlg. 908 ft.
S. H. Gardner's No. 4 Roquemore, 5,176 ft. E, 4,432 f.. S, NW cor. B. C. Jordan Sur. ..... Rigging up.
Magnolia Pet. Co.'s No. 1 Davenport, 660 ft. N, 660 ft. W, SE cor. Jessie Dunlop Sur. ..... Oil well drlg deeper; drlg shale 2,797 ft.
Magnolia Pet. Co.'s No. 16 Carrie G. Steele, B. C. Jordan Sur. ..... Drlg. sandy shale 2,736 ft.
Nemours Corp.'s No. 5 A. C. Tiller, 300 ft S, 300 ft. W, NE cor. W. D. Mathews Sur. ..... Began drlg. Sept. 23; cmtd. 10-in. 60 ft.; drlg. 1,700 ft.
The Texas Co.'s No. 7 G. W. Brumble, 3,415 ft. W, 330 ft. N, SE cor. E. F. Mitcheson Sur. ..... Rigging up.
The Texas Co.'s No. 8 G. W. Brumble, 1,085 ft. E, 330 ft. N, SW cor. John Womack Sur. ..... Derrick.
D. Thomason's No. 2 Tillery, 393 ft. N, 332 ft. E, SW cor. Jane Thorpe Sur. ..... Derrick.

WILDCAT OPERATIONS IN LOUISIANA-ARKANSAS

(Continued from Page 70)

P. J. Becker, trustee's No. 1 Tull, SW cor. NE NE, Sec. 23-12-15 ..... Fishing 7 joints drill stem; T.D. 2,475 ft.
Longstreet Synd.'s No. 1 Ramsey, NE cor. SW NE, Sec. 33-13-16 ..... Changing to heavy rig and arranging to sidetrack; T.D. 2,-802 ft.
Fair et als' No. 1 Hamilton, 500 ft. N, 300 ft. W, SE cor. SE SE, Sec. 1-12-13 ..... Tested 500,000 ft. gas and S.W. 2,793 ft.; W.O. 2,855 ft.
Magnolia Pet. Co.'s No. 1 Anna Mason, 990 ft. S, 990 ft. E, NW cor. SW, Sec. 27-12-11 ..... Began drlg. Sept. 28; cmtd. 15½-in. 116 ft.; drlg. 206 ft.
E. O. Roy's No. 1 Rogers, Sec 13-13-14 ..... Drlg. 2,8455 ft.

FRANKLIN PARISH

Davis et als' No 1 Moore, 600 ft. W, 200 ft. S, NE cor. Sec. 12-11-6 ..... S.D. 1,430 ft.

LASALLE PARISH

Tunica Pet. Co.'s No. 50 L. & A., 200 ft. N, 660 ft. E, SW cor. NW, Sec. 16-7-2e ..... Cmtd. 6-in. 802 ft.; S.D.; W.O.S.R; T.D. 815 ft.

MOREHOUSE PARISH

J. P. White's No. 1 Chess-Wymond, Sec. 32-19-6 ..... Tested S.W. 3,025 ft; W.O.
Rainbow Oil Co.'s No. 1 Louisville Cooperage Co., 990 ft. S and E, NW cor. NE, Sec. 33-22-8 ..... Derrick.

NATCHITOCHES PARISH

S. D. McDaniel's No. 2 Clark & Morse, 800 ft. E, 350 ft. N, C, Sec. 23-5-6 ..... Tested 1,000,000 ft. gas and S.W. 8 ft.; S.D. for orders; T.D. 2,-536 ft.
Nichols & Wilder's No. 1 Clark, 150 ft. W, 250 ft. N, SE cor., Sec. 10-10-8 ..... Rigging up.
Robeline O. & G. Co.'s No. 1, NE SW, Sec. 7-8-9 ..... Drill stem stuck; waiting orders: claim show gas; T.D. 3.230 ft.

OUACHITA PARISH

Farish & Russell's No. 1 School fee, NE, Sec. 16-16-4 .... S.D.; W.O. 4,350 ft.
S. D. Hunter's No. 1 West Va. Lbr. Co. N½ NE, Sec 25-18-5 ..... Rigging up.

RAPIDES PARISH

Ayers Bros.' No. 1 Wickliff, 2,790 ft. N, 150 ft. E, SW cor., Sec. 9-5n-2e ..... Drlg. 900 ft.

RED RIVER PARISH

W. D. Ball's No. 1 Krumholz, 660 ft. S, 660 ft. S, NW cor., Sec. 32-14-10 ..... Began drlg. Sept. 24; drlg. 450 ft.
Benedum & Trees Oil Co.'s No. 1 Franklin Realty Co., 350 ft. E, 350 ft. S, NW cor., Sec. 29-11-9 ..... Coring 3,073 ft.
Eylers O. & G. Co.'s No. 4 Chaffraix, 150 ft. S, 170 ft. W, NE cor. SW SE, Sec. 30-12-10 ..... Drlg. chalk 1,056 ft.
LeGrande et als' No. 1 Sample, Sec. 11-14-11 ..... Rigging up.
D. H. Riddick's No. 1 Johnson, 500 ft. N, 500 ft. W, SE cor., Sec. 17-12-10 ..... Rigging up.

RICHLAND PARISH

Austin & McDonald's No. 2 Millsaps, SW cor., Sec. 17-17-6, Waiting orders; T.D. 2,679 ft.
Austin & McDonald's No. 3 Millsaps, 1,980 ft. S, 660 ft. E, NW cor., Sec. 16-17-6 ..... Tested S.W.; W.O. 2,477 ft.
Austin & McDonald's No. 4 Millsaps, NW cor., Sec. 16-7-6. Location.
Austin & McDonald's No. 5 Millsaps, 2,640 ft. N, 1,320 ft. W, SE cor., Sec. 8-17-6 ..... Derrick.
Palmer Corp.'s No. 2 Miles, 723 ft., E, 660 ft. S, NW cor. NE, Sec. 12-17-6 ..... Cmtd. 6-in. 2,315 ft.
United Carbon Co.'s No. 1 Thornby, 660 ft. W, 650 ft. N, SE cor. NW NE, Sec. 12-16-6 ..... Cmtd. 6-in. 2,280 ft.

SABINE PARISH

R. L. Gay's No. 1-A Bowman-Hicks, 900 ft. S, 200 ft. E, C, Sec. 34-8-12 ..... Drlg. 661 ft.
R. L. Gay, trustee's No. 4 Bowman-Hicks, SE cor. NW SE, Sec. 14-7-14 ..... W.O.S.R.; 1,800 ft. in oil. little S. W.; T.D. 2,350 ft.
R. L. Gay's No. 5 Bowman-Hicks, 1,120 ft. W, 920 ft. N, SE cor., Sec. 14-7-14 ..... Location.
R. L. Gay, trustee's No. 1 Long-Bell Lbr. Co., NE cor NW NW, Sec. 26-8-14 ..... Drlg. 3,215 ft.
R. L. Gay, trustee's No. 2 Sabine Lbr. Co., Sec. 23-7-14.. Drlg. 3,415 ft.
A. H. Tarver's No. 1 Long-Bell Lbr. Co., NW cor. SW NW, Sec. 29-8-13 ..... Fishing for bailer; T.D. 3.535 ft.

UNION PARISH

Fred Stovall's No. 1 Stovall, 1,820 ft. E, 350 ft. N, SW cor., Sec. 32-23-4 ..... Location.

WEBSTER PARISH

F. M. Fuller's No. 1 Monzingo, 200 ft. N, 200 ft. W, SE cor., Sec. 27-18-8 ..... Derrick.
Paul C. Warren et al's No. 1 Martin, 305 ft. N, 212 ft. E, SW cor. Sec. 20-20-9 ..... Derrick.

WEST CARROLL PARISH

H. L. Hunt's No. 1 Chickasaw Imp. Co., NE cor. NE, Sec. 24-23-11 ..... Drlg. 2,800 ft.
Palmer Corp.'s No. 1 Marston, 3,958 ft., N, 1,855 ft. E, SW cor., Sec. 12-19-10 ..... Drlg. shale 1,450 ft.

ARKANSAS
ASHLEY COUNTY

J. G. Marcum, trustee's No. 1 McGarry, 300 ft. W, 100 ft. S, C, Sec. 9-19-4 ..... Drlg. black shale 2,822 ft.

CLARK COUNTY

Wm. Henry, trustee's No. 1 Clark, Sec. 34-9-21 ..... S.D. 1,200 ft.

COLUMBIA COUNTY

Helena O. & G. Co.'s No. 1 Pickler, Sec. 19-19-22 ..... S.D. 2,800 ft.
Talbot & Markle's No. 1 Copeland, 300 ft. S, 300 ft. W, NE cor. SE NW, Sec. 31-19-19 ..... Drlg. 1,400 ft.

GARLAND COUNTY

Givens et als' No. 1 Garrett, 660 ft. S, 660 ft. W, C, Sec. 1-3-19 ..... Began drlg. Aug. 10, 1926; drlg hard sand 3,200 ft.

GRANT COUNTY

Jones & Watkins' No. 1 Meek, Sec. 5-4-11 ..... T.A. 1,400 ft.

JOHNSON COUNTY

Ark.-La. P. L. Co.'s No. 2 Bynum, Sec. 12-10-24 ..... Drlg. 3,465 ft.

LINCOLN COUNTY

Pine Prairie O. & G. Co.'s No. 1 Carter ..... T.A. 2,176 ft.

LITTLE RIVER COUNTY

A. L. Buck's No. 1 Greason, NW NW, Sec. 25-12-32 .... Drlg 1,510 ft.
Grotze et als' No. 1 Allen, Sec. 31-12-31 ..... T.A. 2,941 ft.
McDonald & Shaw's No. 1 W. E. Black, 240 ft. N, 450 ft. W, SE cor. SE NE, Sec. 12-13-28 ..... S.D. 1,542 ft.

LOGAN COUNTY

Ark. Nat. Gas Corp.'s No. 1 Hanna, Sec. 26-7-23 ..... S.D. 3,540 ft.

MADISON COUNTY

Phillips Pet. Co. and F. S. Craver's No. 1, C, Sec. 11-14-28. Tested 250,000 ft. gas 63 ft.; drlg. sand 881 ft.

MILLER COUNTY

E. B. Lenz et als' No. 1 Bossier Co., NW cor. Sec. 13-15-26 Drlg. 2,740 ft.

OUACHITA COUNTY

Copenhaven et als' No. 1 Warnick, Sec. 2-15-17 ..... Drlg. 2,055 ft.
Flaucher et als' No. 1 Buck, Sec. 7-15-17 ..... S.D. 2,465 ft.
C. H. McDonald's No. 1 Fogle, Sec. 13-14-16 ..... S.D. 2,301 ft.; W.O.
Timberlake et als' No 1 Cronner NW cor. SE NE, Sec. 26-14-18 ..... Top Nacatoch 1,631 ft; drlg. 1,-756 ft.
The Texas Co.'s No. 1 Avery, 250 ft. N, 250 ft. E, SW cor., Sec. 35-15-15 ..... Standing 250 ft. oil; 26-ft. sand; W.O.S.R.; T.D. 1,971 ft.
Wesson et als' No. 1 Booth, Sec. 12-15-19 ..... S.D. 2,203 ft.

POPE COUNTY

Ark.-La. P. L. Co.'s No. 1 McFaddin, Sec. 15-9-21 ..... Began drlg. Oct. 1.

PRAIRIE COUNTY

Transcontinental Oil Co.'s No. 1 Louis Novak, 330 ft. E, 330 ft. N, SW cor. SW NE, Sec. 36-2n-6 ..... Rigging up.

UNION COUNTY

Addie & Modisette's No. 1 Union Sawmill, SW cor. SW SE, Sec. 25-19-12 ..... Location.
Ark. Drlg. Co.'s No. 1 Norris, 150 ft. S, 150 ft. W, NE cor. SE SE, Sec. 17-18-12 ..... Began drlg. Sept. 30; drlg. 120 ft.
Sam Arrendale's No. 1 Gallagher & Nelson, 200 ft. N and W, SE cor. Lot 5, Sec. 18-18-17 ..... S.D. 2,268 ft.
W. M. Coates, trustee's No. 1 McDuffie, Sec. 32-19-17 .... Cmtd. 6⅝-in. 3,942 ft; to test 4½-ft. sand; T.D. 4,057 ft.
O. W. Estes' No. 1 Felsenthal, 330 ft. S, 330 ft. W, NE cor. NE NW Sec. 2-18-15 ..... Drill stem test 6 joints mud; little oil 2,110-50 ft; C.D; S.D. 2,-151-57 ft; cmtd. 6-in. 2,110 ft.
E. M. Jones' No. 1 Loutre Lbr. Co., NE cor. NW SW, Sec. 17-19-14 ..... Derrick up.
E. M. Jones' No. 1 Hardy & Murphy, 216 ft. N, 256 ft. W, SE cor. SW, Sec. 34-19-14 ..... Coring 3,093 ft.
McDonald Bros.' No. 1 Mayfield, Sec. 29-19-15 ..... S.D. 2,210 ft.
Stark et als' No. 1 Ainsworth, NE cor. NW NE, Sec. 8-19-16 ..... Derrick.
T. J. Woodley's No. 1 First Natl. Bank, NW cor., Sec. 34-19-18 ..... Derrick.

VAN BUREN COUNTY

Glenn Cole et als, trustee's No. 1 Scanlan, 200 ft. S, 200 ft. W, NE cor. SE NW, Sec. 5-19-13 ..... Drlg. 50 ft.

WASHINGTON COUNTY

O'Hara & Shetterly's No. 1 Boyd, SE cor. SE NE, Sec. 12-16-32 ..... Spudded Sept., 1928; S.D. 140 ft.; resumed drlg. Aug. 25; U.R.: T.D. 150 ft.
C. H. Willoughby's No. 1 Jones, Sec. 34-16-30 ..... Cmtd. 6-in. 1,320 ft.; S.D. 1,342 ft.
Lincoln Leaseholding Synd.'s No. 1 Lincoln, Sec. 30-15-32. S.D. 1,040 ft.; repairs.

WHITE COUNTY

Letona Synd.'s No. 1 Letona, SE cor. NW SW, Sec. 35-9-8. Drlg. black caving shale 3,490-3,500 ft.

EAST TEXAS

BOWIE COUNTY

Hooks O. & G. Co.'s No. 1 Lee Roseberry, L. T. King Sur. Temp. abd.; T.D.3,086 ft.

CAMP COUNTY

Rogers et als' No. 1 Enfelt, R. M. Montgomery Sur. Tested dry 1,870 ft.; S.D. 1,920 ft.

RED RIVER COUNTY

D. M. Buffington's No. 1 Hossier, E. Hughhart Sur. Claim show oil and gas; S.D. 1,-893 ft.

Shad Harper's No. 1 W. R. Garland, J. Wagley Sur. S.D. 1,862 ft.

Johnson Pet Co.'s No. 2 Randolph, Edward Dean Sur. S.D. 1,440 ft.

SHELBY COUNTY

Benedum & Trees Oil Co.'s No. 1 Pickering Lbr. Co., 300 ft. S, 300 ft. W, NE cor. Lot 20, D.T.F. Yordt Sur. Drlg. chalk 2,014 ft.

Chapperall Oil Co.'s No. 2 Holt, Matthew Moore Sur. S.D. for orders 3,004 ft.

Gulf Ref. Co.'s No. 2 Pickering, 463 ft. S, 29 ft. W, SW cor. P. W. Harvey Sur. in J. H. Patterson Sur. Derrick.

MISSISSIPPI

ALCORN COUNTY

Alcorn Pet. Co.'s No. 1 Matthews, SE cor., Sec. 14-2s-7e. Drlg. 2,380 ft.

CHICKASAW COUNTY

Hightower & Golson's No. 1 Flemming, NE cor., Sec. 20 13-3 Quicksand 1,240 ft.

HINDS COUNTY

Harry Gerson's No. 1 Edward House, Blk. 16, West Jackson Subd., City of Jackson, in Twp. 5n, Range 1e Rig up.

Oscar Brown's No. 1 Riverside (formerly Hennessee et als') SE cor. SE SW, Sec. 23-16-5 Set 12½-in. 30 ft; S.D. 1,050 ft.

Mrs. Reeder et als' No. 1 State, SE cor. NW NW, Sec. 25-6-1e S.D. 2,895 ft.

South Christian Institute's No. 1 fee, SE SW, Sec. 29-6-4. Drlg. 400 ft.

HUMPHREYS COUNTY

E. C. Steele et als' No. 1 C. B. Box, SE cor. SE NE, Sec. 25-14-4w Set 12½-in. 60 ft.; S.D.

LAUDERDALE COUNTY

Lauderdale O. & G. Co.'s No. 1 Lackey, 990 ft. S and E. NW cor. NE, Sec. 2-7-16 Cored sand, shale and gumbo 2,-494-2,500 ft.

Meridian O. & G. Co.'s No. 1 Hauser, Sec. 33-8-18 Drlg. 2,648 ft.

J. R. Smith Oil Co.'s No. 1 C. F. Craig, Sec. 2-6-14 Derrick.

LAFAYETTE COUNTY

Binks-Goode et als' No 1 May, 113½ rods S, 26 rods E. NW cor. SW, Sec. 22-10-1w Derrick.

LINCOLN COUNTY

La.-Miss. Oil Co.'s No. 1 Pat Case, NE NE, Sec. 21-8-6 Spudded Feb. 17, 1929; S.D. 50 ft.; resumed drlg. Aug. 12; cmtd. 12½-in. 368 ft.

MONROE COUNTY

Amory Dev. Co.'s No. 1 Bourland, Sec. 2-13-19 S.D.; waiting for 5 3/16-in. csg. 2,580 ft.

Amory Pet. Co.'s No. 1 Hall, Sec. 8-13-19 Fish. for liner and tools 3,045 ft.

Park Bowser et als' No. 1 Cowart, second hole, Sec. 2-12-19 S.D. 30 ft.

RANKIN COUNTY

Home Oil Prod. Co.'s No. 1 E. P. Rainey, NW NW, Sec. 13-5-1e Derrick.

WARREN COUNTY

El Dorado Oil Co.'s No. 1 Dornbush, Sec. 8-18-5 Drlg. 2,335 ft.; reported drlg. 2,-400 ft. in error.

YALOBUSHA COUNTY

Philip Bros.' No. 1 James, Sec. 20-11-5 Drlg. black shale 3,030 ft.

Carter Oil Co. and J. D. Collett's No. 1 Blackmur, 330 ft. S, 990 ft. W, C, Sec. 14-11-4 Location.

TENNESSEE

DECATUR COUNTY

Standard Oil Co. of La.'s No. 1 Wyatt Drlg 1,285 ft.

Chester County Oil Co.'s No. 1 Montgomery Cmtd. 6-in. 1,040 ft.; drlg. hard gray lime 1,165 ft.

ALABAMA

CHOCTAW COUNTY

Robinson & Greeer's No. 1 Douglas Oil Co., 320 ft. N, C. Sec. 15-19-2 Cmtd. 8-in. 2,040 ft.; drlg. Selma chalk 2,400 ft.

LAMAR COUNTY

Briggs & Knapp's No. 1 Wefel, Sec. 25-12-14 Reaming to bottom; T.D. 1,180 ft.

SUMTER COUNTY

B. W. Bates' No. 1 fee, Sec. 3-18-1 U.R. surface csg. at 300 ft.; to set 6-in

WASHINGTON COUNTY

S. A. Hobson's No. 1 Hobson Bros., Sec. 9-8-2 S.D; S.W. flow at 1,450 ft., T.D.

S. A. Hobson's No. 1 Wilson, Sec. 27-7-1 S.D. 700 ft.

GULF COAST FIELDS AND WILDCATS

Week Ended October 5

(Continued from Page 74)

Continental Oil Co.'s No. 1 Cezeaux, south side To pump 4,520 ft.

Humble Oil & Refg. Co.'s No. 4 Williams Pulling liner 4,348 ft.

Humble Oil & Ref. Co.'s No. 5 Williams Shale 4,798 ft.

Humble Oil & Refg. Co.'s No. 1 Glass, south Sticky shale 5,700 ft.

Humble Oil & Refg. Co.'s No. 1 Oates Set and cemented 13⅜-in. casing 1,831-2,340 ft.

Humble Oil & Refg. Co.'s No. 1 Trahon Derrick.

Navarro Oil Co.'s No. 1 La. Oil Refg. Corp. Drlg. gumbo and lime 3,045 ft.

Harvey Smith et al's No. 1 Rosenthall, north side Rigging up to pump 4,205 ft.

South Texas Petroleum Co.'s No. 10 Morris, south side 750 bbls. PLO 4,372 ft.

South Texas Petroleum Co.'s No. 11 Morris, south side Drlg. shale and lime 2,922 ft.

South Texas Petroleum Co.'s No. 1 Lee, south flank Drlg. shale and lime 2,968 ft.

Sun Oil Co.'s No. 47 River, north side No report.

The Texas Company's No. 265 Landslide, south Bailing; showing oil and gas sand 5,442 ft.

The Texas Company's No. 266 Landslide Reaming; bottom in sticky shale 4,960 ft.

The Texas Company's No. 267 Landslide, south Drlg. shale and lime 4,500 ft.

The Texas Company's No. 268 Landslide, south Drlg. shale and lime 3,817 ft.

The Texas Company's No. 269 Landslide, south Drlg. gumbo, lime and boulders 2,473 ft.

The Texas Company's No. 23 House Drlg. shale and boulders 3,530 ft.

West Production Co.'s No. 1 Foster Completed 4,865 ft.; flowing 2,000 bbls.

BLUE RIDGE—FORT BEND COUNTY

Gulf Production Co.'s No. 17 Luscher Drlg. 1,300 ft.

PIERCE JUNCTION—HARRIS COUNTY

Moody Corp.'s No. 5-B Settegast (workover) 4,800 ft., will deepen.

Navarro Oil Co.'s No. 2-A Cain (workover) Rigging up to deepen.

Navarro Oil Co.'s No. 4-B Cain Drlg. 6,060 ft.

Rio Bravo Oil Co.'s No. 11 B. Settegast Drlg. 4,070 ft.

Rio Bravo Oil Co.'s No. 7-A Settegast (workover) Drlg. gumbo 4,290 ft.

Rio Bravo Oil Co.'s No. 14-A Settegast, west Drlg. 5,070 ft.

Saxet Gas Co.'s No. 2 Herman estate, southwest 4,020 ft.; will set strainer.

Saxet Gas Co.'s No. 4 Herman (southwest) Drlg. 4,560 ft.

Saxet Gas Co.'s No. 5 Herman (southwest) Derrick.

Superior Oil Corp.'s No. 5-B Settegast (workover) Milling 4,351 ft.

J. F. Barron's No. 3 Fitzsimmons Derrick.

Shaw & Texas Exploration Co.'s No. 2-F Fitzsimmons Derrick.

T. G. Shaw's No. 1 Dooley Drlg. 5,700 ft.

Shaw and others' No. 3 Fitz Barron Derrick.

Superior Oil Corp.'s No. 5-B Settegast (workover) To deepen.

LIBERTY—LIBERTY COUNTY

Empire Gas & Fuel Co.'s No. 4 Groggan Drlg. 3,550 ft.

Empire Gas & Fuel Co.'s No. 6 Groggan Gumbo 3,450 ft.

Empire Gas & Fuel Co.'s No. 7 Groggan Derrick.

Empire Gas & Fuel Co.'s No. 5 Groggan Derrick.

Navarro Oil Co.'s No. 5 Baldwin Rigging up.

Sun Oil Co.'s No. 49 Mitchell Set 6⅝-inch 3,400 ft.

Sun Oil Co.'s No. 50 Mitchell Sand 2,785 ft.

Sun Oil Co.'s No. 51 Mitchell Gumbo 1,111 ft.

HULL—LIBERTY COUNTY

Empire Gas & Fuel Co.'s No. 27 Barngrover, old well 3,580 ft.; setting strainer.

Gulf Production Co.'s No. 45 Phoenix (workover) Drlg. 3,140 ft.

Gulf Production Co.'s No. 52 Phoenix, (workover) Drlg. gumbo 4,040 ft.

Houston Production Co.'s No. 13 Barngrover Drlg gumbo 3,570 ft.

Republic Production Co.'s No. 35 Dolbear (workover) Drlg. shale 4,380 ft.

Republic Production Co.'s No. 99 Dolbear (workover) Total depth 3,534 ft.

Republic Production Co.'s No. 119 Dolbear Drlg. 300 ft.

The Texas Company's No. 8 Hannah-Vacuum Location.

BIG CREEK—FORT BEND COUNTY

Benedum & Trees' No. 1 Moore Drlg. 830 ft.

Gulf Production Co.'s No. 35 Davis, (workover) Setting strainer 3,360 ft.; swabbing.

Gulf Production Co.'s No. 56 Davis Drlg. 1,480 ft.

The Texas Company's No. 3 Wheat (old well) Cleaning out; will deepen.

NASH—BRAZORIA COUNTY

Rycade Oil Corp.'s No. 26 Wisdom Drlg. hard lime 4,873 ft.

SOUR LAKE—HARDIN COUNTY

Austin et al's No. 1 Watson Rig.

Lake View Oil Co.'s No. 7 Miniolo Drlg. 150 ft.

United Oil & Fuel Co.'s No. 1 Brown Setting strainer 2,005 ft.; bailing.

ORANGE—ORANGE COUNTY

Sinclair Oil & Gas Co.'s No. 5 Gailliere (workover) Setting strainer 3,500 ft.

GOOSE CREEK—HARRIS COUNTY

Cedar Bayou Oil Co.'s No. 11 Busch Sidetrack 1,750 ft.

Russell Ferrell's No. 4 Gillette (workover) Rigging.

Humble Oil & Refg. Co.'s No. 75 Simms-Smith Abandoned 6,277 ft.

Humble Oil & Refg. Co.'s No. 76 Simms-Smith Building derrick.

C. T. Rucker's No. 1 Jones Drlg. 2,310 ft.

Lake Shore Oil Co.'s No. 4 Duke Drlg. 2,140 ft.

Jim McMurry's No. 3 Grace Addey (old well) Setting strainer 2,780 ft.

Lube Well Oil Co.'s No. 1 Dannenbaum, (old well) Tested salt water 1,607 ft.; shut down.

SPINDLETOP—JEFFERSON COUNTY

Yount Lee Oil Co.'s No. 61 McFaddin (workover) Drlg. sand 3,910 ft.

Yount Lee Oil Co.'s No. 70 McFaddin (workover) Set screen 2,962 ft.; flowing 1,450 bbls. PLO; tearing down rig.

Yount Lee Oil Co.'s No. 72 McFaddin (workover) Testing sand and shale 4,829 ft.

Yount Lee Oil Co.'s No. 75 McFaddin (workover) Set screen 4,000 ft.; flowing 1,340 bbls. PLO.

Yount Lee Oil Co.'s No. 80 McFaddin (workover) Started to swab 2,857 ft.

Yount Lee Oil Co.'s No. 113 McFaddin Set whipstock.

Yount Lee Oil Co.'s No. 116 McFaddin Sand at 3,900 ft.

Yount Lee Oil Co.'s No. 117 McFaddin Shale and lime 3,414 ft.

Yount Oil Co.'s No. 24 Fee Rigging up.

Yount Lee Oil Co.'s No. 58 Gladys City (workover) Drlg. sand and lime 3,904 ft.

Yount Lee Oil Co.'s No. 84 Gladys City, (workover) Drlg. sand 3,641 ft.

Yount Lee Oil Co.'s No. 95 Gladys City, (old well) Struck at 5,873 ft.

Yount Lee Oil Co.'s No. 96 Gladys City Sand and shale at 4,420 ft.

Yount Oil Co.'s No. 97 Gladys Setting 10-in. at 477 ft.; shale and lime at 2,538 ft.

WEST COLUMBIA—BRAZORIA COUNTY

Continental Oil Co.'s No. 1 Hogg Will set strainer 235 ft.; sand.

Gulf Production Co.'s No. 3-B Hogg Drlg. gumbo 2,270 ft.

Humble Oil & Refg. Co.'s No. 3 Smith Hard rock 4,451 ft.

Saxet Oil Co.'s No. 1 Hogg Setting strainer 3,450 ft.; sand.

W. L. Pierson's No. 1 Masterson Drlg. 1,650 ft.

HIGH ISLAND—GALVESTON COUNTY

Gulf Production Co.'s No. 5-A Smith Location.

Gulf Production Co.'s No. 1 League (workover) Rig up to work over.

Marrs McLean's No. 6 Cade (old well) To pump.

Marrs McLean No. 15 Cade Flowing 100 bbls. PLO.

Marrs McLean's No. 16 Cade Drlg. 3,390 ft.

ORCHARD—FORT BEND COUNTY

Gulf Production Co.'s No. 19 Moore Drlg. sand 5,225 ft.

NORTH DAYTON—LIBERTY COUNTY

Fort Bend Oil Co.'s No. 1 Ballarack hut down 4,650 ft.

REFUGIO—REFUGIO COUNTY

Benedum & Trees' No. 3 Rooke Rigging up.

Morgan Oil Corp.'s No. 1 Fox heirs Sand showing oil 3,641-43 ft.; set 6⅝-in. casing 3,641 ft.

Hewitt et al's No. 1 Cemetery Cem. 12½-in. surface casing 446 ft.

Houston Gulf Gas Co.'s No. 6 Shelly Coring sandy shale at 5,450 ft.

Houston Gulf Gas Co.'s No. 8 Shelly Drlg. gumbo 400 ft.

Houston Gulf Gas Co.'s No. 5 O'Brien Tested basic sand 3,662-65 ft.; set 8¼-in. casing.

Houston Gulf Gas Co.'s No. 4 Fannie Heard (workover) Drlg. sandy shale 3,120 ft.

Houston Gulf Gas Co.'s No. 8 Fannie Heard Drlg. sticky shale 1,909 ft.

Houston Gulf Gas Co.'s No. 1 Morgan-Skelly Set screen on sand 3,650-65 ft.

Houston Gulf Gas Co.'s No. 1 Vance Comp. 3,683-3,701 ft.; flowing 400 bbls. pipe line oil through 2¼-in. choke; 60 lbs. rock pressure.

Korona Oil Co.'s No. 1 West Drlg. core sand 3,650 ft.

Korona Oil Co.'s No. 2 Reilly Drlg. hard sand 3,503 ft.

Mission Drlg. Co.'s No. 1 O'Brien Sand 5,513-33 ft.; est. spraying 90 bbls. oil.

Mission Drlg. Co.'s No. 1 J. F. B. Heard Milling out 8¼-in. casing 315 ft.

Mission Drlg. Co.'s No. 2 Skelly Drlg. gumbo 1,265 ft.

Mission Drlg. Co.'s No. 1 Fox (workover) Sidetracked drlg. 1,803 ft., sandy lime.

Mission Drlg. Co.'s No. 1 Kuykendall Rigging up.

Mission Drlg. Co.'s No. 2 Mitchell Changing over to heavy rig.

Oigufer Oil Co.'s No. 3 Ryalls Rig.

Saxet Oil Co.'s No. 1 Serafine Rig.

Saxet Oil Co.'s No. 10 Claude Heard Set 10-in. surface casing 500 ft.

Saxet Oil Co.'s No. 1 Fox heirs Set 10-in. surface casing 507 ft.

Houston Oil Co.'s No. 8 Wilson Heard Drlg. sandy shale 3,062 ft.

Houston Oil Co.'s No. 6 Fannie Heard (workover) Waiting cement to set.

Houston Oil Co.'s No. 10 Pratt-Hewitt-Rooke Rig.

Houston Oil Co.'s No. 2 F. Rooke Derrick.

Independent Oil & Gas Co.'s No. 1 O'Brien Drlg. shale 3,700 ft.; no sand yet.

W. L. Pearson, trustee, No. 2 Fox Derrick.

Sun Oil Co.'s No. 1 Leisering Derrick.

Sun Oil Co.'s No. 2 Leisering Location.

Texas Gas Co.'s No. 1 Rogers Killed 1,400 lbs. gas pressure 3,686 ft.; to deepen.

SOUTH LOUISIANA FIELDS

LOCKPORT—CALCASIEU PARISH

Shell Petroleum Corp.'s No. 1 Miller Drlg. shale and lime 7,045 ft.

Vacuum & Gulf's No. 15-A Miller Drlg. 1,070 ft.

Vacuum & Gulf's No. 3 State Drlg. 4,860 ft.

HACKBERRY—CAMERON PARISH

Calcasieu Oil Co.'s No. 7 Dorion, East Hackberry Heaving shale 3,840 ft.

Calcasieu Oil Co.'s No. 4 Lemke Location.

Calcasieu Oil Co.'s No. 4 Coldwell Location.

Fraim Oil Co.'s No. 1 Duhon, Old Hackberry Drlg. gumbo 3,597 ft.

Rycade Oil Corp.-Humble Oil & Refg. Co.'s No. 3 Gulf Flowing 189 bbls. pipe line oil.

Rycade Oil Corp.-Humble Oil & Refg. Co.'s No. 4 Gulf Land Rigging up.

Sunshine Oil Co.'s No. 3 Ellender, Old Hackberry 1,050 bbls. pipe line oil 3,319 ft.

Yount Lee Oil Co.'s No. 9 School Land (Old Hackberry) Heaving shale 5,780 ft.

Yount Lee Oil Co.'s No. 1 Carter & Sweeney Cem. casing 3,250 ft.

Yount Lee Oil Co.'s No. 1 Lacey Coring 3,400 ft.

JENNINGS—ACADIA PARISH

Fred Getty's No. 3 Jennings-Clemont Location.

E. L. Meyers' No. 1 Clemont-Zigler (old well) To work over 1,805 ft.

The Texas Company's No. 5 Rayne heirs (King tract) Drlg. gumbo 3,690 ft.

Yount Lee Oil Co.'s No. 4 Crowley, northeast flank, Section 48-9s-2w Sand 7,675 ft.

Yount Lee Oil Co.'s No. 5 Crowley, Sec. 48-9s-3w Location.

Yount Lee Oil Co.'s No. 7 Houssiere-Latrielle, Sec. 47-9s-2w Drlg. sand and shale 6,230 ft.

EDGERLY—CALCASIEU PARISH

C.-M. Crotty's No. 15 Lillard Drlg. 1,310 ft.

Green Oil Co.'s No. 2 Moore (workover) To deepen.

Rex Petroleum Co.'s No. 10 Hunter (workover) Flowing 300 bbls. pipe line oil; set at 4,290 ft.

VINTON—CALCASIEU PARISH

Gulf Refining Co.'s No. 1 J. W. Gardner ..... Rig.
Gulf Refining Co.'s No. 48 Star Vincent, Sec. 34-10s-12w.. Drlg. 2,861 ft.
Union Petroleum Co.'s No. 2 Matilda Gray (workover) .. Drlg. 1,740 ft.
Marrs McLean's No. 4 Gray (workover) ..... 1,900 ft.; dry; will sidetrack.

BAYOU BOUILLON—ST. MARTIN PARISH

Rycade Oil Corp.'s No. 7 Bouillion fee ..... Drlg. hard sandy shale and lime 4,427 ft.
Rycade Oil Corp.'s No. 3 State (former well) ..... Sidetracking 3,517 ft.

STARKS—CALCASIEU PARISH

Gulf Refining Co.'s No. 11 Lutcher-Moore (workover) .. Pulling screen to deepen

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 750 Fee ..... Flowing 1,100 bbls. pipe line oil.
Union Sulphur Co.'s No. 751 Fee ..... Flowing 3,400 bbls. pipe line oil.

SWEET LAKE—CAMERON PARISH

Pure Oil Co.'s No. 7 Yount Lee ..... Standing cem. 6,881 ft.

ANSE LA BUTTE—ST. MARTIN PARISH

Yount Lee Oil Co.'s No. 5 Louisiana Pet. Co. ..... Coring at 4,900 ft.
Bowie Oil & Gas Co.'s No. 5 Bagnaud ..... No report.

MISCELLANEOUS WILDCATS

TEXAS

AUSTIN COUNTY

Whittington et al's No. 1 Lass, 4 miles northwest of Bellville ..... Drlg. shale 1,900 ft.

BRAZORIA COUNTY

Faust et al's No. 5 Faust ..... Drlg. lime 1,481 ft.
Steel & Strickland's No. 1 Lockridge ..... Drlg. gumbo 1,103 ft.

CHAMBERS COUNTY

Chicago Oil Corp.'s No. 1 Lawrence ..... Shut down in gumbo 1,200 ft.
Layne et al's No. 1 Fitzgerald ..... Shut down in rock 2,635 ft.
Pure Oil Co.'s No. 1 Mayes (workover) ..... To deepen.
Pure Oil Co.'s No. 4 Mayes ..... Location.
Pure Oil Co.'s No. 5 Mayes ..... Location.
Pure Oil Co.'s No. 6 Mayes ..... Location.
Pure Oil Co.'s No. 7 Mayes ..... Location.
Pure Oil Co.'s No. 8 Mayes ..... Location.
Pure Oil Co.'s No. 3 Lost Lake, Lost Lake ..... Drlg. gumbo 1,275 ft.

FORT BEND COUNTY

Gulf Production Co.'s No. 12 Trone, Long Point ..... Drlg. shale 5,145 ft.
Grayburg Oil Co.'s No. 1 Ranson ..... Drlg. shale 4,061 ft.

HARRIS COUNTY

Baldwin and associates' No. 1 Kitzman, Cypress ..... Standing 4,055 ft.
Gulf Crest oil Co.'s No. 1 Gulf Crest ..... Drlg. gumbo 1,650 ft.
A. F. Belunek's No. 1 Thompson ..... Rig.
Hammond et al's No. 1 Brodt ..... Drlg. gumbo 500 ft.
Humble Oil & Refg. Co.'s No. 6 Warren Hockley .... Drlg. shale 3,954 ft.
Humble Oil & Refg. Co.'s No. 1 Sidious Maykawa ..... Putting in blowout preventer.
Humble Oil & Refg. Co.'s No. 2 Woodburn ..... Building derrick.
Rich et al's No. 1 Highlands ..... Derrick.
York & Robertson's No. 1 Garrett, Harris & Carpenter Sur. ..... Sandy shale 1,917 ft.; shut down.

JEFFERSON COUNTY

Blakie Oil Co.'s No. 1 Tolliver, Dynes Sur. ..... Abandoned 2,750 ft.
Deep Test Oil Corp.'s No. 1 Faith-McFadden ..... Drlg. shale 4,238 ft.
Gulf Production Co.'s No. 3 Burrell Fannette ..... Drlg. 5,360 ft.
Gulf Production Co.'s No. 1 Junker, Fannette ..... Sand 3,000 ft.
Gulf Production Co.'s No. 11 Thomas, Fannette (workover) ..... Pumping 150 bbls. pipe line oil.
Gulf Production Co.'s No. 12 Thomas, Fannette ..... Coring 4,200 ft.
River Oil Corp.'s No. 1 Ship Channel, Brown Survey .... Drlg. gumbo 3,088 ft.
Shell Petroleum Corp.'s No. 1 Heisig, Hampshire ..... Drlg. shale and lime 6,987 ft.
The Texas Company's No. 2 Pipkin, Big Hill ..... Drlg. shale and lime at 3,970 ft.
The Texas Company's No. 1 Fitzhugh, Big Hill ..... Drlg. 1,323 ft., sticky shale.
The Texas Company's No. 1 Burrell, Fannette ..... Drlg. lime 2,950 ft.
Vacuum Oil Co.'s No. 1 Herbert-Broussard, T.&N.O. Sur. No. 208. ..... Drlg. shale 4,060 ft.
Westbury Oil Co.'s No. 1 West ..... Shut down; total depth 2,930 ft.

LIBERTY COUNTY

Gulf Production Co.'s No. 1 Weiser ..... Drlg. 1,760 ft.
Gulf Production Co.'s No. 2 Boyt, Hankamer ..... Comp. flowing 500 bbls. 3,690 ft.
Humble Oil & Refg. Co.'s No. 6 Sterling, Moss Bluff .... Drlg. sand 2,571 ft.
Pure Oil Co.'s No. 1 Liberty, Moss Bluff ..... Drlg. shale 5,326 ft.
Union Exploration Co.'s No. 1 Vajdak, Sheeks ..... Drlg. gumbo and lime 2,850 ft.
Union Exploration Co.'s No. 4 Esperson, Sheeks ..... Lime at 2,200 ft.
Yount Lee Oil Co.'s No. 2 Moore Bluff, Sheeks ..... Location.

MONTGOMERY COUNTY

Kelley-Baker et al's No. 1 Juerges ..... Drlg. gumbo 3,065 ft.

ORANGE COUNTY

Galperin et al's No. 1 Mansfield ..... Rigging up.
Gulf Production Co.'s No. 1 J. E. Starks, Port Neches ... Drlg. 1,050 ft.
Gulf Production Co.'s No. 1 M. H. Starks, Port Neches ... Started drilling.
The Texas Company's No. 1 Polk, Port Neches ..... Set 16-in. at 95 ft.
The Texas Company's No. 1 Starks, Port Neches ..... Set casing at 3,170 ft.

SOUTH LOUISIANA

ASCENSION PARISH

Triumph Oil Corp.'s No. 2 Lacey, Sec. 20-10s-4e ..... No report.

CALCASIEU PARISH

Wilfred LaHay's No. 2 James, Sec. 14-10s-13w ..... Drlg. sand 3,400 ft.
J. O. Davis' No. 1 Mims, Sec. 20-9s-7w ..... Standing 5,600 ft.

CAMERON PARISH

Shell Pet. Corp.'s No. 6 Watkins, Black Bayou ..... Shale sand 4,727 ft.; changing boilers.
Shell Pet. Co.'s No. 12 Watkins, Black Bayou ..... Drlg. shale 4,370 ft.
Shell Pet. Corp.'s No. 13 Watkins, Black Bayou ..... Rigging up.
Shell Pet. Corp.'s No. 11 Watkins, Black Bayou ..... Completed 1,825 ft., cavity.
Shell Pet. Corp.'s No. 1 Marceaux, Mallard Bay, Sec. 32-12s-3w ..... Rig.
The Texas Company's No. 4-A Calcasieu Lake, Calcasieu Lake Dome ..... Rig.
Yount Lee Oil Co.'s No. 1 Starks, Sec. 1-15s-15w ..... Shale 2,600 ft.

EVANGELINE PARISH

The Texas Company's No. 1 Guillory, Pine Prairie ..... Sandy shale 3,883 ft.

IBERIA PARISH

The Texas Company's No. 4-A Vermilion Bay ..... Rig.

IBERVILLE PARISH

Shell Petroleum Corp.'s No. 3 Wilbert, White Castle .... Total depth 6,029 ft. in salt; fishing 5,995 ft.
Standard Oil Co.'s No. 3 Wilbert, Bayou Blue ..... Set screen 1,925 ft. and made few heads; hole standing full of oil completed est. 75 bbls. initia production.
Standard Oil Co.'s No. 2 Schwing, Bayou Blue ..... Total depth 3,435 ft.
Standard Oil Co.'s No. 3 Schwing, Bayou Blue ..... Location.
Standard Oil Co.'s No. 4 Schwing, Bayou Blue ..... Location.
Standard Oil Co.'s No. 5 Schwing, Bayou Blue ..... Derrick.

JEFFERSON DAVIS PARISH

Vacuum Oil Co.'s No. 2 DeVilbiss, Roanoke ..... Drlg. 4,350 ft.

PLAQUEMINE PARISH

The Texas Company's No. 2 Garden Island Bay, Sec. 107-23s-32e ..... Standing.
Humble Oil & Refg. Co.'s No. 1 Cockrell-Moran, Sec. 2-20s-26e ..... No report.

ST. BERNARD PARISH

St. Bernard Oil & Gas Co.'s No. 1 Fee, Sec. 15-14s-15e ... Shut down 726 ft.

ST. LANDRY PARISH

Gulf Refining Co.'s No. 2 Gaudet, Pont Perre ..... Location.

ST. MARTIN PARISH

Ohio Oil Co.'s No. 2 Martin, Hager Dome ..... Abandoned 4,490 ft.
The Texas Company's No. 1 fee, Hager Dome ..... Drlg. sand 4,590 ft.
The Texas Company's No. 2 St. Martin, Hager ..... Drlg. gumbo 1,890 ft.
The Texas Company's No. 3 fee, Hager ..... Location.
The Texas Company's No. 4 fee, Hager ..... Location.
The Texas Company's No. 1 Iberville, Hager ..... Rig.
The Texas Company's No. 2 Iberville, Hager ..... Location.
The Texas Company's No. 3 Iberville, Hager ..... Location.

ST. TAMMANY PARISH

St. Tammany Oil Co.'s No. 2 Fritchie, Sec. 35-8s-11e ... Shut down 3,032 ft.

TANGIPAHOA PARISH

Completion Oil Co.'s No. 1 Amos ..... 1,700 ft., gumbo and shale.
Joan Development Co.'s No. 1 Hilton, Sec. 20-9s-9e ..... Cem. 6⅝-in. casing 3,000 ft.; standing.

TERREBONNE PARISH

Charles Caggi's No. 1 Evergreen, Sec. 14s-18s-16e ..... Drlg. 650 ft.
The Texas Company's No. 2-A Dog Lake Bayou, 400 ft. south of No. 1 ..... Derrick.
The Texas Company's No. 1-B Dog Lake, Sec. 6-22s-16e.. Drlg. rock 1,390 ft.
The Texas Company's No. 1 Taylor, East Bay Junop Dome ..... Drlg. shale 2,525 ft.
The Texas Company's No. 2-A Lake Barre, Section 30-21s-20e ..... Sandy shale 3,849 ft.; setting casing to test.
The Texas Company's No. 2-B Bay Coon Road, Sec. 17-22s-18e ..... Gas killed; waiting orders 971 ft.
The Texas Company's No. 3-B Bay Coon Road, Sec. 17-22s-18e ..... Derrick.
The Texas Company's No. 3 La. L. L. & E. Co., Four Isle.. Drlg. 1,328 ft.

OKLAHOMA FIELDS

(Continued from Page 66)

week ending October 3. It is a decrease of 1,491 bbls. from last week.

The Asher Pool declined 655 bbls. on the week's report. The daily average was 7,513 bbls. The water intrusion is affecting the wells in this pool.

Sasakwa Pool has been increased by the Pure Oil Co.'s No. 4 Bates, in Section 13-6-7, Seminole County, which gauged 4,000 bbls. on the first 24 hours' production. The daily average production for the pool for the past week was 14,175 bbls. from 18 wells.

In the north extension to the St. Louis Pool, Sinclair Oil & Gas Co. and McGraw Oil Co.'s No. 2 Kelly-A, NW cor. NE, Section 2-7-4, Pottawatomie County, had the Wilcox sand at 4,287-89 feet, where it encountered salt water and a showing of oil. It had 2,000 feet of fluid in the hole, some of which was oil. It is believed most of the oil is coming from the Simpson lime. The companies expect to plug the test back to the Simpson and make a small producer.

North of Cushing

The second test to make a Wilcox sand producer in the area north of Cushing was the Shaffer Oil & Refining Co.'s No. 1 Echo Hawk, NW cor. NE, Section 9-18-5, Payne County. It made 387 bbls. of oil on September 28; 437 bbls. September 30, and 430 bbls. October 1. The Wilcox sand was found at 3,573-90 feet. This test had a good showing of oil in the Viola lime a few weeks ago. It is believed the company will deepen the well farther in the sand in an effort to increase production. Same company's No. 1 Little Chief, SW cor. NW NE, Section 4-18-5, Payne County, averaged 710 bbls. for the week ending October 3, from the Wilcox sand at 3,482-3,534 feet. The above tests are about three-quarters of a mile apart and considerable other drilling is getting under way in these sections.

In the southern and southwestern part of the State, Campen & Lassiter have blocked in Sections 3, 8, 10, 15, 22-5s-2, Carter County, southeast of Ardmore. The same company has taken over the test which is shut down at 420 feet, in the SE cor. NE SE, Section 32-4s-2, Carter County. The new owners are preparing to clean out this test and drill it deeper.

The following figures explain why the Healdton Field is considered one of the best pools in the State from a production standpoint. The field was discovered in 1913 and is 16 years old. The daily average production for the month of June, 1926, was 15,061 bbls. from 1,911 wells. Three years later for the month of July, 1929, the pool averaged 12,856 bbls. from 1,947 wells, an increase of 36 wells and a decrease of 2,205 bbls. daily in a period of three years.

The Arclo Oil Co. and others' No. 1 Cruce, NE cor. NW SE, Section 35-4s-2w, Carter County, cored a showing of oil in sand at 4,137-43 feet, another at 4,171-74 feet, another at 4,197-4,223 feet, and another at 4,244-51 feet, all showing oil. The test is drilling deeper at 4,292 feet.

Wirt Franklin Petroleum Corp.'s No. 1 Van, SW cor. NW NW, Section 4-5-9w, Caddo County, could not recover the drill pipe and is plugging back to the showing at 3,535 feet. The total depth of the test was 5,855 feet. This test is the deepest drilled in that county.

Beebe Pool

In the Beebe Pool, the Transcontinental Oil Co.'s No. 2 Bolan, NE cor. SW NW, Section 19-5-5, Pontotoc County, went dead September 28. It was swabbed September 29, and made 908 bbls. No gauge was taken of the water. On September 30 it gauged 1,050 bbls.

The Independent Oil & Gas Co. is drilling a wildcat test 2 miles northwest of the pool, in the Beebe area. The test is No. 1 Fleming, NE cor. SE SW, Section 10-5-4, Pontotoc County. It was drilling at 2,743 feet October 4.

The Operators Oil Co. has purchased the 120 acres in the S half SE and NW SE, Section 17-19-9, Creek County, from Short, McMan and Winemiller. The lease has one producing well making 27 bbls. daily from the Skinner sand. The reported consideration was $40,000.

Pipe Line Runs

The daily average pipe line runs from the St. Louis Pool for the week, ending October 2 are as follows:

Company—	Bbls.
Consolidated	2,807
Cosden	580
Gulf	3,485
Magnolia	14,340
Oklahoma	1,176
Prairie	21,264
Shell	2,755
Sinclair	16,174
Texas	1,549
Tidal	8,352
Total	72,482

The daily average pipe line runs from the Seminole area for the week ending October 2 are as follows:

Company—	Bbls.
Barnsdall	4,791
Champlin	4,248
Continental	633
Consolidated	518
Cosden	10,498
Empire	10,124
Gulf	48,513
Magnolia	19,881
Oklahoma	49,120
Prairie	65,723
Producers & Refiners	559
Pure	4,717
Shaffer	3,387
Shell	9,379
Sinclair	33,207
Texas	15,565
Tidal	22,092
White Oak	2,636
Total	306,094
Tank cars	8,948
Grand total	315,042

Another pipe line company plans to enter the Oklahoma City area. The Shell Petroleum Corp. will lay a 6-inch line from its Meeker station to the Oklahoma City Pool. This line will connect with the company's main line running north and south which is an 8 and 10-inch trunk line. Survey has been made and construction work will start immediately.

Northern Operations

Leasing in the northern part of the State has been active all summer but has now quieted down. The majority of the oil companies have already purchased a number of blocks and acreage spreads in this area. It seems that most of the oil companies are marking time until some indication of oil or gas is found in this wildcat area. A showing of oil in any one of the drilling tests will boom this area again. If oil production is found it will probably be deep. The following drilling wells are expected to test out the deeper formations: The Bu-Vi-Bar and others' No. 1 fee, SE cor. SW, Section 10-25-15w, Woods County, was drilling at 5,914 feet. Sinclair Oil & Gas Co.'s No. 1 Shore, C NE SW, Section 33-27-16w, Woods County, was fishing at 5,333 feet. Cement has been run to sidetrack the bailer and after it hardens drilling will be resumed. Peerless Oil & Gas Co.'s No. 1 Crowell, C SW NE, Section 14-28-16w, Woods County, was drilling at 1,400 feet. Prairie Oil & Gas Co.'s No. 1 Wilber, NE cor., Section 23-23-17w, Woodward County, is

drilling at 5,430 feet. Harris & Haun's No. 1 Wyatt, C SE, Section 9-23-20w, Woodward County, is drilling at 4,490 feet, after setting the 6-inch casing at 4,400 feet, in shale. Sinclair Oil & Gas Co.'s No. 1 Howell, C SW SW, Section 14-26-24w, Harper County, is preparing to run 9-inch casing at 5,312 feet in shale. J. V. Bailey and others' No. 1 Acre, SW cor. NE, Section 14-24-11w, Alfalfa County, is drilling at 2,865 feet in shale. It is being drilled in a 17,000-acre block.

In the Muskogee Townsite Pool, in Section 35-15-18, Muskogee County, three dry holes have been completed offsetting the discovery well completed about a month ago which is still pumping around 100 bbls. daily.

Southeastern Kingfisher and northeastern Canadian Counties are active areas in leasing at this time. Several wildcat tests are drilling in this county. Superior Oil Corp.'s No. 1 Story, SE cor., Section 25-19-5w, Kingfisher County, is cleaning out at 5,850 feet, with a total depth of 6,285 feet. Galt Brown Drilling Co.'s No. 1 Wolf, NW cor. SE, Section 6-16-7w, Kingfisher County, may resume drilling after being shut down in a dry sandy shale at 6,015-23 feet.

Creek County

Link Oil Co.'s No. 4 Freeman, NE cor. SW NE, Section 33-18-7, is drilling at 820 feet. Sinclair Oil & Gas Co.'s No. 24 Dunson, CSL SW SE, Section 33-17-7, is an old well drilling deeper from 1,520 feet. Texas Pacific Coal & Oil Co.'s No. 1 Harjoche, SE cor. NE, Section 21-17-9, is rigging up to deepen from 1,210 feet. O. M. Irelan and others moved the rig in for No. 3 Hays, NW cor., Section 10-17-10. A. B. Ice's No. 8 Fulsom, CWL SW SW, Section 13-17-10, is rigging up. Texas Pacific Coal & Oil Co.'s No. 8 Beaver, SW cor. NW NW, Section 17-16-9, is drilling deeper at 2,950 feet. The Texas Company made location for No. 1 Sewell, NW cor. SW NW, Section 26-16-10. Curtis Oil Co. made location for No. 1 Allen, SE cor. NE NE, Section 27-16-10.

O. M. Irelan and others' No. 1 Creek, CNL S half, Section 3-17-10, has been abandoned at 1,677 feet. Phillips Petroleum Co.'s No. 2 Houston, NW cor. NE NE, Section 20-19-9, made 20 bbls. in sand 2,425-47 feet. Magnolia Petroleum Co.'s No. 21 Vance, CNL NW NE, Section 7-18-7, has been completed for 40 bbls. in sand 2,521-96 feet. No. 8 Mussellman, NE cor. NW SE, Section 8-18-7, made 10 bbls. in sand 2,573-2,646 feet. Texas Pacific Coal & Oil Co.'s No. 8 Harjoche, SW cor. SE NE, Section 21-17-9, has been completed for 10 bbls. in sand 2,449-70 feet. Central Commercial Oil & Gas Co.'s No. 1 Jones, NE cor., Section 9-17-10, made 3,000,000 feet of gas in sand 1,051-69 feet. Carter Oil Co.'s No. 9 Durant, SE cor. NE NE, Section 18-16-9, flowed 7,750 bbls. in Dutcher sand 3,008-34 feet. Franchott & Mid-Continent Petroleum Corp.'s No. 11 Carr, SE cor. NE NE, Section 26-16-9, was completed for 20 bbls. in sand 2,904-11 feet.

Cotton County

Shasta Oil Co. has the rig up for No. 5 Slogan, SW cor. NW NE NE, Section 2-2s-10w. Wirt Franklin Petroleum Corp.'s No. 1 Bandy, NW cor., Section 4-4s-10w, is rigging up. Bridewell and others' No. 1 Porter, NE cor. SE SE NW, Section 17-1s-11w, has been abandoned at 2,565 feet. Scott & Arington's No. 1 Cogswell, SE cor. NW SE, Section 26-1s-10w, is dry and abandoned at 2,303 feet. Wirt Franklin Petroleum Corp.'s No. 3 Chambers, SE cor. SW SE, Section 35-1s-10w, flowed 145 bbls. in sand 2,154-81 feet. Shasta Oil Co.'s No. 3 Slogan, NW cor. NE NE, Section 2-2s-10w, swabbed 163 bbls. from sand 2,155-58 feet.

Garfield County

Continental Oil Co. and others made location for No. 1 Brown, CNL SW, Section 10-20-4w.

Grady County

Oklahoma Public Service Corp.'s No. 5 Dryden, NW cor. NE SE, Section 35-5-8w, has cemented 8-inch casing at 2,196 feet. Oklahoma Gas Utilities Corp.'s No. 1 Warren, SE cor. NE NW NW, Section 36-4-8w, is a rig.

Grant County

Consolidated Utility Corp.'s No. 2 Henn, C SW NE, Section 35-28-3w, is making 8,000,000 feet of gas from sand 4,047-85 feet.

Hughes County

W. B. Pine made location for No. 2 Welch, SW cor. SE NE, Section 6-8-9. Independent Oil & Gas Co. moved the rig in for No. 1 Walker, C SW NW, Section 12-7-8. Burke-Greis Oil Co.'s No. 1 Oliphant, SE cor. NE NW, Section 18-9-9, has been completed for 175 bbls. in sand 3,486-89 feet.

Jefferson County

Bridewell Oil Co. made location for No. 1 Seay, SE cor., Section 29-6s-5w.

Kay County

Blackwell Oil & Gas Co. is erecting the rig for No. 2 Liegrote, NW cor. SE NE, Section 29-25-1w. George Nehr and others' No. 4 Paden, C SW NW, Section 31-28-1, has been completed for 300,000 feet of gas at 903 feet. Parrish and others' No. 4 School Land, SE cor. SW NW NE, Section 36-28-1w, is dry and abandoned at 767 feet.

K'owa County

George Eshelman and others staked location for No. 1 School Land, NE cor., Section 13-6-17w. No. 3 Foster, SE cor. NE SW NW, Section 18-6-16w, is drilling at 75 feet.

Lincoln County

Continental Oil Co. made location for No. 2 School Land, NE cor. NW, Section 36-17-3.

Logan County

Shell Petroleum Corp.'s No. 6 Sebranek, SE cor. SW NE, Section 30-19-4w, has been completed for 2,056 bbls. in Wilcox sand 6,012-22 feet. No. 9 McCully, SW cor. SE, Section 30-19-4w, made 2,860 bbls. in Wilcox sand 5,940-70 feet. No. 10 McCully, NE cor. NW SE, Section 30-19-4w, has been completed for 1,785 bbls. in Wilcox sand 5,950-6,010 feet.

McIntosh County

Jennings Brothers' No. 1 Crabtree, SE cor. NE SW, Section 31-10-14, is a rig under construction.

Muskogee County

John Aggas' No. 1 Wheat, SE cor. NE SW, Section 28-16-15, is drilling at 1,518 feet. Paul & Morgan's No. 4 Sango, C NE NW, Section 17-15-17, is spudding. A. Fortwangler and others' No. 1 Jackson, NE cor. SE SE, Section 19-15-17, is a machine on the location. M. S. Mussellem moved a machine in for No. 2 Campbell, SE cor. NW SE SE, Section 33-14-19. Mazda Oil Co.'s No. 4 Jackson, SW cor. NE SE NW, Section 8-13-16, is drilling at 430 feet. Muskogee Natural Gas Co. has a machine on the location for No. 3 Smith, SE cor. NW SE SE, Section 18-13-19.

Okfuskee County

Wirt Franklin Petroleum Corp. made location for No. 1 Theimer, SE cor., Section 2-11-3w. No. 1 Enoch, NE cor., Section 11-11-3w, is also a location. Indian Territory Illuminating Oil Co. and others staked location for No. 1 Butterfield, SE cor. NE NE, Section 11-11-3w. Wirt Franklin Petroleum Corp. made location for No. 6 Lowery, NW cor. SE NW NW, Section 12-11-3w. No. 7 Lowery is a location C E half E half NW, Section 12-11-3w.

Coline Oil Co. made location for No. 5 Warren, SE cor. SW, Section 18-11-2w. No. 6 Warren, NE cor. SE SW, Section 18-11-2w, is also a location. Indian Territory Illuminating Oil Co. and others made location for No. 1 Lucy Banta, SW cor. SE, Section 18-11-2w. Location has been made for No. 1 Pearl Trosper, NW cor., Section 18-11-2w. No. 3 Farley, NE cor. NW, Section 19-11-2w, is also a location. Location was made for No. 2 S. Hiddleston, NW cor. NE, Section 19-11-2w.

Okfuskee County

Champlin Oil & Refining Co. has the rig up for No. 3 Parrish, NW cor. SW SW, Section 14-11-11. Eagle Picher Lead Co.'s No. 3 Tiger, SE cor., Section 35-11-11, is rigging up. Hazlett and others moved a machine in for No. 2 Johnson, CEL NE, Section 3-10-11. Holm & Jarvis' No. 2 Buckley, NW cor. NE NW, Section 21-10-11, is a rig on the ground. T. C. Iglehart's No. 1 Barnett, NE cor. SE NW, Section 28-9-10, is rigging up. Superior Oil Corp. has a machine on the ground for No. 1 Buick, NW cor. NE NE, Section 29-9-10.

Okmulgee County

Miller and others' No. 1-A Powell, NE cor., Section 31-16-1w, is a rig on the ground. J. H. Rebold's No. 1 Brooks, SW cor. NE, Section 6-15-13, is cleaning out to deepen from 2,095 feet. E. J. Lambert's No. 5 L. Freeman, SE cor. NW, Section 7-15-15, has been completed for 750,000 feet of gas in sand 1,224-39 fet. Edgerley and others' No. 1-A Brown NE cor. SE, Section 28-15-13, made 4 bbls. in sand 1,592-1,602 feet. M. A. Wilder and others' No. 1-A Richards, NW cor., Section 33-14-12, has been abandoned at 3,001 feet.

Osage County

Peters Petroleum Co. and Producers & Refiners Corp.'s No. 4, SW cor. NW NE, Section 27-27-11, is rigging up. Galt Brown Oil Co. made location for No. 6, SW cor. NE NW, Section 7-24-8. J. A. Presbury and others 'No. 3, SW cor. NE NE NW, Section 35-24-8, is rigging up. Oklahoma Power & Water Co.'s No. 123, SE cor. SW, Section 4-20-10, is a machine rigging up. Indian Territory Illuminating Co.'s No. 420, NE cor. SW SW NE, Section 34-29-10, is dry and abandoned at 532 feet. Osage Gas Producers Co.'s No. 395, CSL NE SW, Section 29-28-11, has been completed for 1,250,000 feet of gas in Mississippi lime 1,824-61 feet. Barnsdall Oil Co. and Branstetter's No. 5, NE cor. SE SE, Section 22-22-11, made 30 bbls. in Bartlesville sand 1,626-34 feet. Oklahoma Power & Water Co.'s No. 122, SW cor., Section 4-20-10, has been completed for 1,000,000 feet of gas in sand 377-80 feet. The Prairie Oil & Gas Co.'s No. 6, SE cor. SW SW, Section 30-25-8, made 325 bbls. in sand 2,474-2,514 feet.

Pawnee County

Peter Adamson Jr.'s No. 7 Thomas, SW cor. NE, Section 25-21-8, is drilling at 700 feet. P. M. Kerr and others made location for No. 1 McCoy, NW cor. SW NW, Section 21-20-9. Peter Adamson Jr.'s No. 6 Thomas, SE cor. SW NE, Section 25-21-8, is dry and abandoned at 1,135 feet. Capitol Hill Oil Co.'s No. 1-A Green, NE cor. SE, Section 25-21-8, has been completed for 10 bbls. in Layton sand 1,085-1,115 feet. Superior Oil Corp.'s No. 1 Brodell, NE cor. NW NE, Section 20-20-9, is dry and abandoned at 2,765 feet in Wilcox sand. Johnson Oil & Refining Co.'s No. 1 Byles, SE cor. NE, Section 27-20-9 has been completed for 118 bbls. in Red Fork sand 2,132-75 feet. Roy Sears and others' No. 5 Wiggs, CSL NE NW, Section 35-20-9, made 129 bbls. in Red Fork sand 1,998-2,039 feet.

Payne County

Shaffer Oil & Refining Co. has the rig up for No. 3 Little Chief, NE cor. NW NE, Section 4-18-5. Location has been made for No. 4 Little Chief, SE cor. NW NE, Section 4-18-5. Transcontinental Oil Co. made location for No. 3 Lincoln, NE cor. NW SE, Section 4-18-5. Comail Oil Co.'s No. 2 Garr, SW cor. NE SW, Section 9-19-5, has been abandoned at 3,802 feet.

Pittsburg County

Colton & Lester's No. 1 Gumm, NE cor. SE SE, Section 10-7-18, is rigging up. R. P. Lester and others moved a machine in for No. 1 Carney, NE cor. NW, Section 15-7-18.

Pontotoc County

Dixie Oil Co. moved the rig in for No. 1 Cotton, SE cor., Section 13-5-4. Transcontinental Oil Co. made location for No. 4 Bolen, SW cor. NW NW, Section 19-5-5, Bebee Pool. Location has been made for No. 5 Bolen, NW cor., Section 19-5-5. No. 2 Bolen, NE cor. SW SW, Section 19-5-5, made 2,132 bbls. from Viola lime 2,282-89 feet. Benedum & Trees' No. 1 Mathews, NE cor. SE, Section 31-5-5, has been completed for 166 bbls. in Simpson sand 2,600-70 feet. No. 1 Coker, SW cor. NW NW, Section 31-5-5 made 148 bbls. in Simpson sand 2,570-2,650 feet. Empire Oil & Refinings Co.'s No. 2 Norris, SE cor. NW, Section 19-5-5, has been completed for 125 bbls. in Viola lime 2,325-85 feet.

Pottawatomie County

Shell Petroleum Corp. has the cellar dug for No. 3 Jordan, SE cor. SW NW, Section 9-8-5 Maud Pool. No. 4 Jordan, SW cor. SE NW, Section 9-8-5, is also a cellar. Gypsy Oil Co.'s No. 3 Gossland, NE cor. NW SW, Section 9-8-5, is also a cellar. Magnolia Petroleum Co. made location for No. 4 Green, NE cor. NW, Section 20-8-5. No. 4 Billington, SW cor. NE NW, Section 22-7-4, St. Louis Field is rigging up to deepen.

Shell Petroleum Corp.'s No. 2 Jordan, NW cor. SW NW, Section 9-8-5, Maud Pool, has been completed for 1,113 bbls. in Hunton lime 4,057-63 feet. Gypsy Oil Co.'s No. 3 Green, NE cor. SE, Section 17-7-4, St. Louis Field, made 430 bbls. in Viola lime, 3,958-80 feet after making 3,610 bbls. from Hunton and then deepening. No. 4 Green, NE cor. NW SE, Section 17-7-4, flowed 342 bbls. from 4,178 feet in Simpson sand. Shell Petroleum Corp.'s No. 1 Hines, NE cor. SW NW, Section 22-7-4, made 2,033 bbls. in Simpson sand 4,155-78 feet.

Seminole County

Burke-Greis Oil Co.'s No. 4 Jones, SE cor. SW SW, Section 17-9-6, East Earlsboro Pool, is a cellar. Carter Oil Co. has made location for No. 2 Powell, SW cor. SE SW, Section 17-9-6. Magnolia Petroleum Co. staked location for No. 4 Panos, NW cor. NE NE, Section 18-9-6. Gypsy Oil Co. has the cellar dug for No. 4 B. Noble, NE cor. NW NE, Section 18-9-6. Amerada Petroleum Corp. and Dixie Oil Co. moved the rig in for No. 1 Fullerton, NW cor. NE SE, Section 19-9-6. The Texas Company's No. 3 Magruder, SE cor. NW, Section 19-9-6, is a rig on the ground. Shell Petroleum Corp.'s No. 5 Hopper, SW cor. NE, Section 19-9-6, is a cellar. No. 6 Hopper, SE cor. SW NE, Section 19-9-6, is also a cellar. The cellar has been dug for No. 7 Hopper, SW cor. SE NE, Section 19-9-6. Magnolia Petroleum Co. made location for No. 2 Brame, NW cor. NE NE, Section 8-7-7, East Little River Pool. Material is being moved in for No. 1 Coker, SW cor. SE, Section 13-7-6, Little River Pool. Blackwell Oil & Gas Co. has the rig on the ground for No. 1 Hull, SW cor. SE SE, Section 6-6-8, Sasakwa Pool. Pure Oil Co. has the cellar dug for No. 5 Bates, SW cor. NE NE, Section 13-6-7. Carter Oil Co. made location for No. 1 Harjo, NW cor. NE SE, Section 13-6-7.

Barnsdall Oil Co.'s No. 1 Gilliam, SE cor. NE SE, Section 13-9-5, Earlsboro Pool has been completed for 293 bbls. in Wilcox sand 4,233-42 feet. Carter Oil Co.'s No. 1 Community-Wisner, SW cor. NE, Section 16-9-6, drilled to 3,605 feet, plugged back to 3,559 feet and flowed 100 bbls. Burke-Greis Oil Co.'s No. 1 Jones, NW cor. SW SW, Section 17-9-6, East Earlsboro Pool, has been completed for 2,880 bbls. in Wilcox sand 4,250-70 feet. Gypsy Oil Co. and Devonian Oil Co.'s No. 2 S. Payne, NE cor. SE, Section 18-9-6, made 1,062 bbls. in Wilcox sand 4,264-87 feet. Carter Oil Co.'s No. 1 Wrightsman, NW cor. NE NE, Section 19-9-6, made 8,380 bbls from Wilcox sand 4,195-4,211 feet. Sinclair Oil & Gas Co.'s No. 4 L. Harjo, NW cor. SE SE, Section 11-8-5, Carr City Pool, has been completed for 252 bbls. in Wilcox sand 4,256-68 feet. W. B. Pine's No. 4 Harjo, SE cor. SW SE, Section 6-8-6, Mission Pool, swabbed 720 bbls. from Wilcox sand 4,341-48 feet. Magnolia Petroleum Co.'s No. 2 Reed, SW cor. NE, Section 4-8-7, is pumping 45 bbls. at 3,281 feet. The Texas Company's No. 1 Chilcoat, SW cor. NW, Section 4-7-7, East Little River Pool, has been completed for 1,135 bbls. in Wilcox sand 4,195-4,210 feet. Sinclair Oil & Gas Co.'s No. 2 Phillips, NE cor. SE, Section 5-7-7, made 3,415 bbls. in Wilcox sand 4,170-93 feet. No. 4 Phillips, NW cor. SE SE, Section 5-7-7, flowed 1,630 bbls. from Wilcox sand 4,335-52 feet. Indian Territory Illuminating Oil Co.'s No. 1 Holatka, NW cor. SE SE, Section 7-6-8, Sasakwa Pool, flowed 830 bbls. from Wilcox sand 4,151-54 feet. Signal Oil Co.'s No. 2 Bond,

NW cor. SW NE, Section 13-6-7, is dry and abandoned at 4,161 feet. No. 4 Bond, SE cor. SW NE, Section 13-6-7, flowed 2,125 bbls. in Wilcox sand 4,152-53 feet. Gypsy Oil Co.'s No. 2 Peters, NE cor. SE NE, Section 23-5-7, made 830 bbls. in Wilcox sand 4,104-14 feet. No. 3 Peters, SW cor. SE NE, Section 23-5-7, swabbed 325 bbls. from Wilcox sand 4,132-43 feet.

Stephens County

Denver & Wichita Falls Pipe Line Co.'s No. 1 Allen, NE cor. SE, Section 35-1-9w, has deepened from 2,571 feet to 2,765 feet and shut down. Armour and others' No. 5 Spears, NW cor. SW, Section 32-1-8w, is rigging up. Ellis Drilling Co.'s No. 8 Nigh, SE cor. SW NW, Section 34-1s-8w, is drilling at 285 feet. Ven Mex Oil Co. and Mid-Continent Petroleum Corp.'s No. 3 Smith, SW cor. SE SW SE, Section 35-1s-8w, is rigging up. Magnolia Petroleum Co. has the rig up for No. 6 Marks, SE cor. NW NE SE, Section 13-2s-8w. Pace and others made location for No. 1 Andrea, NE cor., Section 24-2s-8w. Mardun Oil Co. made location for No. 1 Anderson, SE cor., Section 9-2s-6w. Tooey & Long's No. 1 Leftwitch, NW cor. SW NW NW, Section 11-3s-5w, is drilling at 805 feet.

Magnolia Petroleum Co.'s No. 8 D. Russell, NW cor. NE SW, Section 25-1s-9w, has been abandoned at 2,460 feet. No. 1 Stephens, SW cor. NW NW, Section 33-1s-8w, has been completed for 4,000,000 feet of gas in sand 1,862-67 feet. Ellis Drilling Co.'s No. 7 Nigh, NE cor. SE SW NW, Section 34-1s-8w, made 25 bbls. in sand 2,209-11 feet. Wirt Franklin Petroleum Corp.'s No. 2 W. Bell, SW cor. NW NE, Section 24-1s-4w, is dry and abandoned at 3,300 feet. Ven Mex Oil Co.'s No. 2 Dixon, SW cor. SE NW, Section 30-1s-3w, made 195 bbls. in sands 2,533-2,655 feet. Pace and Texhoma Oil Co.'s No. 3 Houston, NW cor. SE SW, Section 2-2s-8w, has been completed for 45 bbls. in sand 2,160-64 feet.

Tulsa County

Union Drilling Co.'s No. 1 Anthis, NE cor. NW NE, Section 13-19-10, is drilling at 1,500 feet.

Wagoner County

Horner and others' No. 1 Nichols, NW cor. NE NW, Section 35-18-17, is drilling at 110 feet. O. F. Webb and others' No. 2 Smith, NE cor. SW, Section 6-16-15, is drilling at 1,360 feet. Cherokee Public Service Co. is preparing to deepen No. 1-A Marshall, SW cor. NE SE, Section 35-16-17. Western Drilling & Equipment Co. moved a machine in for No. 1 Ross, SE cor. SW, Section 15-16-19.

PRODUCTION OF ST. LOUIS POOL

Average daily production for the St. Louis Pool for the week ending September 30:

Company, farm—	Location	Wells	Prod.
Amerada:			
Richardson	16-7-4	1	20
Atlantic:			
Burke	16-7-4	3	549
Bass	9-7-4	1	125
Mildrum	15-7-4	1	107
Bewley	9-7-4	1	29
Atlantic-Darby:			
Standridge	10-7-4	1	81
Barnsdall:			
Stahl	30-7-4	3	422
Blackwell:			
Cherry	25-7-4	3	580
Lewis	24-7-4	2	115
Carter:			
Adkin	2-7-4	1	...
McGee	26-7-4	1	25
Darby:			
Harber	23-7-4	1	35
Nixon	9-7-4	2	185
Youngblood	16-7-4	4	798
Cardwell	15-7-4	1	436
Empire:			
Bettis	17-7-4	1	80
Jackson	36-8-4	1	346
State	36-7-4	1	155
Gypsy:			
Bruno	25-7-4	4	77
Collins	25-7-4	4	493
Dodson	26-7-4	4	110
Green	17-7-4	4	803
Johnson	29-7-4	1	3
LeClair	23-7-4	4	1,490
Rosemond, No. 1	26-7-4	4	425
Johnson	7-7-4	1	51
Stahl	30-7-4	8	155
Healdton:			
Hines	17-7-4	1	90
Home Gas Co.:			
St. Louis	14-7-4	1	253
Houston Oil:			
Wyatt	17-7-4	3	910
Independent:			
Barrow	1-7-4	3	706
Blandin	30-7-4	5	1,025
Youts	19-7-4	8	3,943
Independent-Darby:			
Brown	14-7-4	2	6
Carson	23-7-4	1	Off
Curley	22-7-4	1	Off
Davis	15-7-4	1	Off
Freid	23-7-4	2	93
Jordon	10-7-4	1	22
LeClair	23-7-4	1	56
Pappan	16-7-4	2	664
Pillar	15-7-4	1	8
Standridge	14-7-4	3	30
Wallace	14-7-4	4	77
Independent et al:			
Hambry	14-7-4	2	19
Was	30-7-5	1	27
Independent-Range:			
Null	35-8-4	1	170
Independent-Skelly:			
James	16-7-4	2	290
Independent-Mid-Kansas:			
Westerfield	2-7-4	1	1,338
Independent-Westland:			
Booze	9-7-4	1	36
Rhodd	16-7-4	4	709
I. T. I. O.:			
McGee	26-7-4	1	151
Shobe	35-8-4	2	143
Weams	21-7-5	1	84
I. T. I. O.-Sinclair:			
Woodard	18-7-5	1	57
Inter-Ocean:			
Coley	24-7-4	1	17
McGee	23-7-4	6	249
Irvin & Marten:			
Kelly	2-7-4	3	765
Magnolia:			
Banta	14-7-4	3	232
Billington, C.	11-7-4	1	6
Brandenburg	18-7-5	5	1,241
Bullock	18-7-5	1	1
Caudle	13-7-4	2	101
Cherry "A"	25-7-4	5	393
Cherry "B"	26-7-4	3	2,261
Clour	11-7-4	2	21
Davis, C. E.	24-7-4	1	10
Davis, Frank	15-7-4	2	13
Engle	34-7-4	1	60
Fyke, Geo. "A"	20-7-5	1	143
Fyke, Geo. "B"	20-7-5	2	356
Fyke, L. L.	20-7-5	1	7
Fyke, Tulle "A"	20-7-5	1	92
Fyke, Tulle "B"	20-7-5	2	252
Fyke, Tulle "C"	20-7-5	1	36
Fyke, Tulle "D"	20-7-5	2	295
Fyke, Tulle "E"	20-7-5	1	10
Green, B. M.	13-7-4	1	9
Green, Lulla	13-7-4	1	101
Guinn	20-7-5	1	12
Harden	12-7-4	2	217
Hatcock, C. D.	11-7-4	1	8
Hatcock, Lee	11-7-4	1	71
Harper, J. J.	19-7-5	1	11
Harper, James	19-7-5	2	6
Hembree	19-7-5	4	92
Jones, "A"	18-7-4	1	84
Jones, M. B.	9-7-4	1	10
Kiner	17-7-5	1	3
Latimer	17-7-4	2	204
Louis, J. L.	15-7-4	1	15
Mull	15-7-4	1	1
Nicklass	31-7-5	2	64
Nona	11-7-4	1	44
Pugh	7-7-5	1	Off
Richardson	17-7-4	2	156
Risenhoover	14-7-4	4	12
Robbins, J. M.	15-7-4	4	185
Robbins, Pearl	15-7-4	1	44
Rowe, I.	18-7-5	1	18
Rowe, M.	18-7-5	1	5
Shipshewano	19-7-5	4	72
Singletary, D.	15-7-4	1	43
Singletary, F.	23-7-4	3	17
Singletary, T.	14-7-4	3	36
Tartar	15-7-4	1	137
Vieux, F.	13-7-4	1	7
Vieux, N.	13-7-4	1	1
White, Roy	20-7-5	1	6
Wilborn, Mary	24-7-4	2	431
Wilborn, S. A.	24-7-4	6	809
Youts, Chas.	20-7-5	5	286
Younts, C. A.	19-7-5	4	425
Younts, H. E.	20-7-5	7	1,319
Magnolia-Pierce:			
Hubanks	17-7-4	2	1,001
McCulloch, et al:			
Bruno	25-7-4	5	726
Smith	25-7-4	6	904
Mid-Continent:			
Decker	8-7-4	1	80
Robbins	9-7-4	2	25
Quinn	20-7-5	1	21
Mid-Kansas:			
Getzelman	25-7-4	4	745
Lunay	30-7-5	3	375
Minnehoma:			
Simms	16-7-4	3	445
Packard:			
Church	29-7-5	1	620
Panther:			
Town Lot	14-7-4	2	40
Phillips:			
Cherry	25-7-4	2	140
Grace	2-7-4	1	71
Lydick	24-7-4	1	20
Stahl	30-7-5	4	489
Prairie:			
Desmond	25-7-4	4	81
Ellison	25-7-4	4	310
Gammon	30-7-5	8	2,678
Hembree, A. O.	19-7-5	4	1,322
Hembree	18-7-5	1	14
Linn	30-7-5	4	512
Smith	30-7-5	3	27
Wolf	29-7-5	4	1,781
Younts	19-7-5	4	207
Prairie et al:			
Davis	18-7-5	4	70
Nesbit	18-7-5	2	252
Pugh	7-7-5	1	23
Prairie-Shaffer-Indep.:			
Cummings	17-7-4	2	412
Regan	17-7-4	2	3,271
Rice	17-7-4	2	93
Pure:			
Dodson	26-7-4	2	125
Thomas	26-7-4	4	3,542
Thrilkill	19-7-5	1	61
Tolen	1-7-4	1	122
Shaffer O. & R.:			
Cherry	23-7-4	4	113
Tolen	30-7-5	4	390
Shell:			
Hines	22-7-4	1	710
Smith	21-7-3	1	80
Stahl	30-7-5	1	50
Younts	28-7-5	1	27
Sinclair:			
Blandin	24-7-4	13	1,450
Brandenburg	7-7-5	3	758
Bruno	28-7-4	2	593
Coley	24-7-4	2	280
Gilbreath	25-7-4	2	838
M-Qua-Ka	11-7-4	1	38
Nadash	29-7-5	4	479
Neeley	25-7-4	6	600
Neeley "B"	25-7-4	2	598
Nesbit	18-7-5	8	1,684
O'Kitchee	19-7-5	7	623
Sinclair et al:			
Kelly "A"	2-7-4	2	394
Decker	16-7-4	1	885
Slick-White Eagle:			
Latimer	16-7-4	2	511
Superior:			
Caudle	24-7-4	2	40
Jackson	36-8-4	1	60
Texas:			
Cherry	25-7-4	4	250
Zoeller	30-7-5	1	30
Tidal:			
Smith	26-7-4	1	20
Warner-Quinlan:			
Light	18-7-4	1	90
Westheimer-Daube:			
Freid	24-7-4	5	559
Garrett	23-7-4	2	70
Westheimer-Daube-Gypsy:			
McGee	23-7-4	5	87
Wyatt:			
Fee	10-7-4	1	20
Total		426	61,017

Asher Pool

Commerce Devel. Co.:			
Townsite	19-6-4	1	Off
Independent:			
Gardiner	19-6-4	1	165
Prairie-Slick:			
Laster	19-6-4	7	3,115
Simms:			
Laster	19-6-4	5	3,669
Slick:			
Bledsoe	20-6-4	1	45
Alexander	19-6-4	1	206
Weldon	20-6-4	2	146
Slick-Amerada:			
Walker No. 1	19-6-4	1	142
Texola:			
Townsite	19-6-4	1	25
Total		20	7,513

Sasakwa Pool

Carter:			
Phillips	18-6-8	1	50
Spillman	7-6-8	1	15
Prairie:			
Diament	12-6-7	1	1,242
Patton	18-6-8	1	83
I. T. I. O.:			
Holatka	7-6-8	1	867
Shell:			
Holatka	7-6-8	1	480
Signal:			
Bond	13-6-7	3	3,002
Sinclair:			
Davis "A"	7-6-8	4	3,950
Texas:			
Bryan	9-6-8	1	50
Pure:			
Bates	13-6-7	2	353
Twin State:			
Marshall	6-6-8	1	Off
Total		21	10,034

PRODUCTION OF SEMINOLE POOL

Average daily production of the Seminole area for the week ending September 30:

Little River Pool

Amerada:			
Hotulke	2-7-6	1	...
Nitey	2-7-6	3	374
Amerada-Wilcox:			
Fore	35-8-6	2	463
Barnsdall:			
Cotcha	23-7-6	3	709
Hotulke	22-7-6	3	500
Walker	4-7-6	1	8
Blackwell:			
Baker	11-7-6	5	595
Nitey	35-8-6	5	153
Talley	14-7-6	4	991
Thomas	11-7-6	1	Off
Bryan & Emery:			
Walker	4-7-6	1	13
Carter:			
Cotcha, M.	23-7-6	2	9
Cudjo, L.	23-7-6	2	170
Factor	26-7-6	1	17
Fish	36-8-6	3	471
Harjo, C.	11-7-6	3	2,165
Harjo, M.	13-7-6	4	426
Jackson	11-7-6	4	531
Larney, B.	26-7-6	2	331
Larney, J.	24-7-6	4	1,435
Lena	10-7-6	1	311
Moore	11-7-6	2	164
Tewee	14-7-6	6	748
Thomas	11-7-6	1	312
Walker, J.	24-7-6	1	793
Wilson	12-7-6	1	183
Champlin:			
Tewee	14-7-6	3	887
Continental:			
Cosar	36-8-6	7	783
Cosar, M.	25-8-6	1	261
Continental & Fisher:			
Milsey	11-7-6	2	293
Continental & Shaffer:			
Harrison	4-2-7	3	2,037
Empire:			
Charty	24-7-6	1	60
Coker	13-7-6	2	402
Cotcha	27-7-6	2	5
Sandlin	3-7-6	1/4	10
Gypsy:			
Brown, C.	33-8-6	1	179
Brown, M.	33-8-6	1	517
Campbell	33-8-6	1	9
Conard	22-7-6	2	224
Cosar, W.	36-8-6	2	183
Cotcha	23-7-6	13	1,814
Denmark	11-7-6	3	593
Hulhoke	14-7-6	10	887
Mungee	1-7-6	1	Off
Payne	5-7-7	6	6,033
Pottie	35-8-6	4	313
Renton	11-7-6	3	404
Walker	5-7-7	1	1,297
Independent:			
Carpenter	27-7-6	3	327
Davis, R.	13-7-6	7	1,283
Reed	26-7-6	1	6
Tewee	14-7-6	6	1,117
Williams	15-7-6	1	418
Independent & Highway:			
Harris	23-7-6	13	2,119
Indep. & White Eagle:			
Davis	2-7-6	5	928
I. T. I. O.:			
Campbell	1-7-6	1	215
Dungan	35-8-6	3	452
House, M. A.	1-7-6	1	25
House, W. E.	1-7-6	1	12
House, "B"	2-7-6	4	489
Hull	26-8-6	2	373
Jackson	1-7-6	3	279
McCulla	1-7-6	2	543
Nitey	2-7-6	5	123
Phoebe "A"	36-8-6	1	16
Phoebe "B"	36-8-6	2	178
Reed	1-7-6	1	Off
Soketheche	1-7-6	3	75
Magnolia:			
Cruse	2-7-6	4	384
Denby	11-7-6	4	232
Harjo, A.	14-7-6	2	25
Harjo, B.	14-7-6	2	184
Pottie	35-8-6	4	15
Reed, E.	31-8-7	1	30
Reed, I.	22-7-6	3	344
Wolfe	20-8-7	1	44
McCulloch & Sands:			
Harrison	4-7-6	1	Off
Mid-Continent:			
Brunner	11-7-6	4	130
Eleck	23-7-6	1	15
Smith	5-7-7	10	9,400
Wadsworth	36-8-6	4	44
W. B. Pine:			
Bean	13-7-6	1	78
Hoyecha	26-8-6	7	1,319
Pine-Phillips:			
Pottie	35-8-6	1	65
Prairie:			
Chilcoat	25-8-6	3	563
Davis	13-7-6	1	28
Dungan	35-8-6	1	Off
Gibson	14-7-6	5	955
Harris	14-7-6	4	771
House	2-7-6	4	120
Johnson	24-7-6	2	896
Lustey	5-7-7	1	4
Moppin	24-7-6	2	193
Reed	13-7-6	2	746
Talley	14-7-6	4	746
Thomas	5-7-7	2	1,559
Williams	15-7-6	2	183
Carr	9-7-7	1	161
Wood	26-7-6	3	180
Cudjo	26-7-6	4	598
Prairie & Amerada:			
Sunny	14-7-6	5	1,059
Prairie & Pine:			
Coker	1-7-6	2	392
Pure:			
Brinson	24-7-6	3	821
Cotcha	14-7-6	12	2,420
Harjo	11-7-6	4	1,490
Hollins	11-7-6	1	602
Reiter-Foster:			
Bunyard	14-7-6	2	535
Jefferson	31-7-6	1	10
McCann	33-7-6	1	38
Shaeffer:			
Narcombe	36-8-6	2	40
Shell:			
Caesar	11-7-6	1	25
Glass	26-7-6	1	10
Hotulke	23-7-6	5	1,029
Johnson	13-7-6	4	703
Sinclair:			
Blanton	11-7-6	1	273
Cosar	30-8-6	3	775
Haney	12-7-6	1	135
Phillips	5-7-7	4	7,420
Tewee	14-7-6	2	975
Sinclair & Kingwood:			
Pompey	24-7-6	1	265
Skelly:			
Carl	14-7-6	2	1,378
Snowden-McSweeney:			
Tiger	13-7-6	2	41
Superior:			
Potulka	31-8-6	1	2
Texas:			
Brooks	25-8-6	1	8
Chilcoat	4-7-7	1	1,001
Coker	1-7-6	3	3
Janey	11-7-6	6	748
Texas & Independent:			
Hutulke	23-7-6	7	1,171
Hutulke	22-7-6	3	338
Tidal:			
House	1-7-6	1	311
Johnson	1-7-6	1	11
Twin State:			
Lowe	25-8-6	1	35
Total		375	82,117

Maud Pool

Amerada:			
Ballard	1-8-4	1	64
Fehlig	7-8-5	1	51
Gossland	8-8-5	3	89
Gravel	1-8-4	1	12
Hallum	1-8-4	4	1,700
Amerada and Barnsdall:			
Wallace	17-8-5	4	350
Amerada & Hull:			
Green	20-8-5	3	90
Continental-Shell:			
Everetts	18-8-5	2	37
Darby:			
Ketcham	19-8-5	1	...
Empire:			
Smith	8-8-5	2	574

Company, farm—	Location	Wells	Prod.
Gypsy:			
Bourassa	7-8-5	4	57
Gossland		1	698
Miller	18-8-5	8	343
Independent:			
Harding	18-8-5	4	160
I. T. I. O.:			
State	16-8-5	1	63
Laurel O. & G.:			
Billington	18-8-5	3	92
Magnolia:			
Billington	8-8-5	4	73
Green	20-8-5	3	100
Smith	20-8-5	1	57
McMan:			
Roberts	9-8-5	1	480
Mid-Continent:			
Shelton	18-8-5	3	25
Phillips:			
Hudson	19-8-5	3	159
Wallace	17-8-5	2	64
Pine:			
Lingefelt	18-8-5	2	134
Smith	8-8-5	2	381
Prairie:			
Campbell	18-8-5	8	122
Prairie & White Eagle:			
Villines	20-8-5	1	5
Pure:			
Lindly	18-8-5	8	319
Urbansky	19-8-5	2	37
Wiley	8-8-5	4	791
Shell:			
Jordon	9-8-5	2	1,334
Sinclair:			
Bellars	19-8-5	10	495
Calvin	7-8-5	3	162
Lewis	6-8-5	2	50
Skelly & Lenox:			
Green	20-8-5	1	110
Skelly & Margay:			
Lingefelt	18-8-5	4	129
Texas:			
Calvin	7-8-5	9	191
Tidal:			
Dunn	12-8-4	1	40
Everett	18-8-5	2	49
Smith	8-8-5	1	74
Twin State:			
Calvin	7-8-5	2	92
Wilcox:			
Smith	8-8-5	7	1,005
Total		130	10,858

Mission Pool

Amerada:			
Rice	5-8-6	2	580
Carter:			
Micco	8-8-6	2	230
Fuswa	18-8-6	3	631
Melisse	9-8-6	1	521
Continental:			
Main	7-8-6	4	1,258
Darby:			
Judy	1-8-5	1	57
Gypsy:			
Baby	6-8-6	1	15
Barkus, N.	6-8-6	10	3,393
Barkus, S.	7-8-6	1	64
Dosar	7-8-6	5	941
Hardy	7-8-6	7	354
Harjoche	7-8-6	3	25
Micco, L.	8-8-6	2	46
Micco,S	8-8-6	1	2
Mission	5 & 6-8-6	7	1,309
Mosar	1-8-5	4	632
Independent:			
Lawson	1-8-5	5	974
Independent & Kistler:			
Payne	7-8-6	3	1,149
McMahon et al:			
Harjo	7-8-6	2	780
Mid-Continent:			
Ripley	13-8-5	1	135
Minnehoma:			
Neal	7-8-6	4	553
Pine:			
Harjo	6-8-6	3	1,194
Micco	8-8-6	1	22
Prairie:			
Crain	7-8-6	1	64
Melton	6-8-6	3	908
Micco	5-8-6	1	5
Townsend	6-8-6	2	826
Nellie	12-8-6	1	156
Prairie & Gypsy:			
Owens	18-8-6	2	187
Shaffer:			
Weaver	12-8-5	3	1,091
Shell & Marland:			
Herndon	7-8-6	3	581
Shell & Papoose:			
Maines	7-8-6	8	757
Sinclair:			
Hardy	7-8-6	4	565
Sinclair & Lenox:			
Judy	1-8-5	1	35
Tidal:			
Nelly	12-8-5	5	1,675
Twin State:			
Hayes	8-8-6	2	981
Judy	6-8-6	2	476
Ripley	12-8-5	2	101
Total		113	23,273

Bowlegs Pool

Amerada:			
Roscoe	15-8-6	6	464
Atlantic:			
Baker	10-8-6	4	236
Fleet	23-8-6	3	146
Grayson	13-8-6	3	474
Jones, A.	16-8-6	2	21
Jones, C.	9-8-6	1	15
Barnsdall:			
McNac	28-8-6	1	18
Murrow	11-8-6	4	281
Carter Oil:			
Bowlegs	15-8-6	4	333
Burden	23-8-6	2	238
Harjoche	14-8-6	6	444
Hilly	23-8-6	3	252
Jones	11-8-6	4	454
Walker	15-8-6	4	404
Wise	23-8-6	11	1,296
Dixie:			
Culley	11-8-6	1	30
Empire:			
Lacy	14-8-6	6	227
Wise	23-8-6	2	134
Gypsy:			
Bowlegs	22-8-6	1	...
Cumsey	10-8-6	4	489
Grayson	13-8-6	4	486
Harjoche	10-8-6	3	306
Jones	11-8-6	1	46
Walker	15-8-6	7	877
Wise	23-8-6	2	79
I. T. I. O.:			
Barnett	24-8-6	1	61
Barnett "B"	23-8-6	1	Off
Billington	22-8-6	3	300
Bowlegs	22-8-6	9	1,102
Davis	13-8-6	4	20
Fay	13-8-6	9	942
Goforth	15-8-6	12	944
Livingston	15-8-6	10	971
Lizzie	13-8-6	3	141
Walker	15-8-6	8	962
Williams	12-8-6	1	199
Wilmott	15-8-6	4	371
Work	24-8-6	1	61
Youngblood	24-8-6	1	5
Magnolia:			
Davis	13-8-6	3	207
Davis, M.	13-8-6	1	80
Hammond	10-8-6	8	246
Rhodos	12-8-6	5	372
Van Buskirk	9-8-6	4	300
McCulloch:			
Bowlegs	22-8-6	1	59
Mid-Continent:			
Baker	10-8-6	4	153
Smith	12-8-6	6	574
Minnehoma:			
Bowlegs	15-8-6	1	50
Prairie:			
Gahagan	23-8-6	3	237
Harber	10-8-6	8	1,254
Jones, G.	3-8-6	3	321
Jones, N.	11-8-6	1	151
Templeton	12-8-6	4	1,802
Whitney	23-8-6	4	371
Pure Oil:			
Reed	14-8-6	14	2,125
Strother "D"	11 & 14-8-6	4	548
Strother "F"	10-8-6	7	1,686
Shaffer:			
Lacy	14-8-6	3	400
Shell:			
Taylor	16-8-6	5	16
Sinclair:			
Cumsey	10-8-6	4	995
Ellen	11-8-6	5	565
Harjo	14-8-6	3	725
Jones	9-8-6	7	235
Taylor	10-8-6	4	635
Taylor, W.	10-8-6	3	568
Walker	22-8-6	4	812
Texas:			
Reed	14-8-6	11	668
Tidal:			
Grayson	13-8-6	4	468
Harjoche	10-8-6	6	866
Total		295	31,318

Earlsboro Pool

Amerada:			
Anderson	15-9-5	1	186
Cowden	4-9-5	7	971
Rogers	3-9-5	2	76
Sullivan	17-9-6	2	3,540
Atlantic & Sinclair:			
Foreman	18-9-5	1	108
Barnsdall:			
Brown	10-9-5	3	985
Bruner, F.	2-9-5	2	165
Bruner, N.	10-9-5	1	248
Cudjo	14-9-5	1	23
Davis, D.	11-9-5	3	77
Davis, J.	11-9-5	4	655
Davis, M.	11-9-5	2	23
Gibson	9-9-5	7	741
Gilliam	13-9-5	1	177
Hern	15-9-5	1	1
Ingram	1-9-5	6	271
Noble	18-9-6	2	984
Pack, S.	10-9-5	4	66
Peter	10-9-5	3	54
Sango	1-9-5	2	1,127
Sebalka	15-9-5	1	157
Sullivan, H.	11-9-5	1	4
Sull-Harjo	10-9-5	2	9
Wasutke	12-9-5	3	497
Burke-Greis:			
Wisner	6-9-6	2	237
Burke-Greis & Red Bank:			
Mays	1-9-5	3	1,770
Jones	17-9-6	1	2,125
Carter:			
Davis	13-9-5	3	84
Cox	31-10-6	1	78
James	6-9-6	3	1,439
Carter et al:			
Gilliam	13-9-5	2	1,111
Green	19-9-6	1	7,385
Continental:			
Kays	2-9-5	2	79
Spencer	12-9-5	4	654
Sarber	13-9-5	1	48
Cosden, J. S., Inc.:			
Anderson	13-9-5	2	1,554
Empire:			
Barker	12-9-5	1	15
Edmondson	3-9-5	2	15
Anderson	13-9-5	2	310
Empire & Amerada:			
Bullock	8-9-5	2	682
Empire & Amerada:			
Henry	8-9-5	1	1,202
Gypsy:			
Bruner	10-9-5	4	870
Keys	6-9-5	1	25
Carter, B.	11-9-5	7	1,524
Earl	16-9-5	1	11
Hunick	5-9-5	2	1,255
Noble, B.	18-9-6	2	2,330
Noble	12-9-5	3	529
Payne	18-9-6	6	9,612
Peter	10-9-5	1	86
Sango	1-9-5	11	1,994
State	16-9-5	2	151
Wisner	13-9-5	1	166
Independent:			
Bruner	10-9-5	3	122
Sullivan	10-9-5	1	12
Knapp	8-9-5	2	746
Indep.-Margay:			
Gains	11-9-5	3	79
Magnolia:			
Anderson, A.		8	7,913
Anderson, D. W.	18-9-6	2	3,495
Bryant	9-9-5	5	49
Cowden	4-9-5	1	22
Dixon	12-9-5	1	14
Edmondson	3-9-5	1	4
Germany	30-9-5	1	9
Gilliam	13-9-5	3	2,104
Holmsley	11-9-5	6	6
Hyde	13-9-5	2	19
Ingram	10-9-5	1	10
Lena	10-9-5	3	23
Moore	24-9-5	2	1,240
Seay	12-9-5	9	315
Simpson	10-9-5	4	208
Sparks	11-9-5	6	95
Sullivan	12-9-5	2	217
Mid-Continent:			
McCumber	9-9-5	3	31
Rogers	5-9-5	5	1,900
Mid-Kansas:			
Anderson	14-9-5	1	30
Minnehoma:			
Noe	17-9-6	1	20
Phillips:			
Dunaway	14-9-5	1	20
Reade	8-9-5	2	1,269
Prairie:			
Baker	24-9-5	5	1,089
Calkins	17-9-5	2	4,997
Davis	13-9-5	3	429
Graham, C.	3-9-5	1	5
Graham, O.	10-9-5	4	746
James	6-9-6	2	...
Reitman	18-9-6	3	3,316
Stidham	11-9-5	9	459
Wisener	18-9-6	1	1,453
Prairie & Skelly:			
Campbell	6-9-6	7	2,347
Skelly & Whitney:			
Harjo	24-9-5	1	5
Shaffer:			
Clark	1-9-5	2	185
Shell:			
Bayless	17-9-5	1	11
Hearn	13-9-5	1	37
Spencer	12-9-5	2	1,120
Sinclair:			
Alexander	36-10-5	1	810
Foreman	18-9-5	1	14
Hollins	12-9-5	1	...
Miller	24-9-5	1	690
Sango	2-9-5	4	535
Skelly:			
Mays	1-9-5	4	357
Shepard	6-9-6	4	1,761
Spencer	12-9-5	1	198
Skelly & Atlantic:			
Cherry	6-9-6	4	304
Lottie	6-9-6	3	641
Varnum	5-9-6	1	408
Superior:			
Ingram	1-9-5	2	783
Sangster	8-9-5	1	972
Walker	2-9-5	2	1,032
McKay	36-10-5	1	145
Texas:			
Anderson	2-9-5	8	122
Brown	10-9-5	8	107
James	6-9-6	2	159
Rogers	5-9-5	5	372
Wilmott	10-9-5	6	68
Tidal:			
Walker	35-10-5	2	1,435
Watkins	9-9-5	7	1,445
Twin State:			
Barker	12-9-5	2	24
Magruder	7-9-5	1	611
Hern	2-9-5	2	50
Anderson	22-9-5	1	8
Total		331	102,574

Carr City Pool

Amerada:			
Reed	12-8-5	1	15
Barnsdall:			
Coker	11-8-5	9	1,399
Fife	14-8-5	2	136
Tally	10-8-5	1	102
Carter:			
Coker	2-8-5	2	1,913
Empire:			
Cluck	11-8-5	13	2,970
Gypsy:			
Coker	10-8-5	1	1
C. Coker	2-8-5	1	938
Fife	14-8-5	1	15
I. T. I. O.:			
Simpson	10-8-5	1	Off
Tully	10-8-5	1	Off
Magnolia:			
"Fee"	11-8-5	3	329
Killing	14-8-5	1	5
Prairie:			
Billington	11-8-5	10	1,246
Mitchell	15-8-5	1	50
Sinclair:			
Bean	11-8-5	5	940
Harjo	11-8-5	4	630
Total		57	10,689

Seminole Pool

Amerada:			
Fixico	23-9-6	2	69
Killingsworth	23-9-6	4	337
Rentie	23-9-6	3	284
Atlantic:			
Cudjo, N.	35-9-6	3	387
Barnsdall:			
Carter	24-9-6	6	186
Henry	14-9-6	2	462
Jones	34-9-6	4	483
Carter Oil:			
B. Carter	24-9-6	2	29
F. Carter	23-9-6	3	116
Creamer	34-9-6	1	7
Cudjo, R.	35-9-6	4	90
Cudjo, W.	34-9-6	1	84
Gilliland	27-9-6	1	158
Grisso	23-9-6	4	131
Grisso, M.	15-9-6	1	213
Killings, G. F.	14-9-6	4	50
Killings, M. E.	23-9-6	12	4,076
Knapp	13-9-6	1	30
Lukes	27-9-6	5	955
Pounder	34-9-6	2	174
Simpson	35-9-6	2	107
Strothers	34-9-6	4	431
Wisner	16-9-6	1	96
Vierson	23-9-6	1	18
Sanford	16-9-6	1	203
Empire:			
Gross	25-9-6	1	50
Wilson	34-9-6	2	248
Gypsy:			
Butler	35-9-6	4	744
Carter	24-9-6	8	691
Cudjo	34-9-6	4	784
Fixico	26-9-6	7	65
Harjo	25-9-6	3	321
Wolfe	26-9-6	4	532
Independent:			
Fixico, P.	23-9-6	3	475
Harjo	25-9-6	2	40
Butler	35-9-6	3	262
Fixico, T.	26-9-6	5	250
Jones	26-9-6	4	350
I. T. I. O.:			
Allen	25-9-6	2	38
Bowlegs	26-9-6	12	2,032
Goodin	23-9-6	3	201
Harjo	23-9-6	3	43
James	24-9-6	2	40
Reed	24-9-6	1	8
Kingwood:			
Johnson	22-9-6	3	425
Magnolia:			
Boren	2-8-6	1	4
Franks	25-9-6	3	184
Mid-Continent:			
Rentie	14-9-6	9	454
Tayeche	24-9-6	5	156
Phillips:			
Strothers	27-9-6	2	73
Prairie:			
Cudjo	35-9-6	3	416
Franks	35-9-6	6	816
Giblet	35-9-6	3	1,195
Gross	25-9-6	5	26
Mason	36-9-6	1	43
Spencer	13-9-6	1	6
Strothers	27-9-6	3	1,260
Tiger	1-8-6	1	25
Pure Oil:			
Strothers	26-9-6	17	3,810
Strothers, B.	36-9-6	4	357
Strothers, C.	34-9-6	1	305
Shell:			
Harber	22-9-6	1	82
Lasley	22-9-6	2	26
Sinclair:			
Carter	13-9-6	2	20
Cudjo "A"	35-9-6	6	645
Cudjo "B"	35-9-6	4	675
Dicey	22-9-6	2	345
Fixico	23-9-6	4	463
Superior:			
Cudjo	35-9-6	4	67
Noble	15-9-6	1	1
Texas:			
Mayhue	14-9-6	1	214
Strothers	2-9-6	2	57
Darby:			
Carter	24-9-6	4	244
Fixico	26-9-6	7	1,507
Harjo	25-9-6	1	22
Harjo, T.	23-9-6	3	45
Turman:			
Cudjo	35-9-6	4	635
Grisso	35-9-6	1	211
Jones	14-9-6	4	1,018
Total		273	32,181

East Seminole Pool

Barnsdall:			
Keypaya	7-9-7	1	18
Continental:			
Boeing	17-9-7	1	36
Perry	18-9-7	2	468
Johnson	18-9-7	3	2,545
Devonian:			
Harjo	18-9-7	1	10
Gypsy:			
Harjo	18-9-7	2	398
Magnolia:			
Drewey	18-9-7	2	42
Prairie:			
Stubbs	18-9-7	3	92
Shaffer:			
Haighler	19-9-7	1	16
Sinclair:			
B. Coody	18-9-7	3	2,985
D. Coody	17-9-7	1	87
B. Johnson	18-9-7	1	200
G. Johnson	18-9-7	1	105
Thompson "B"	18-9-7	1	677
J. Warrior	17-9-7	1	40
Okfuskee	18-9-7	1	165
S. Warrior	17-9-7	1	72
Total		26	7,956

Searight Pool

Amerada:			
Johnson	4- 9-6	1	22
Nicey	3- 9-6	1	9
Strothers	3- 9-6	2	129
Barnsdall:			
Johnson	22-10-6	1	16
Jackson	5- 9-6	2	20
Burke-Greis:			
Nevins	32-10-6	1	754
Varnum	32-10-6	1	128
Carter:			
Davis	4- 9-6	2	174
Amerada	11- 9-6	1	16
Frazier	3- 9-6	5	383
Carter et al:			
Slick	11- 9-6	2	666
Kiker	2- 9-6	1	15
Skiff	10- 9-6	1	39
Mandler	3- 9-6	2	5
Stewart	10- 9-6	1	232
Scott	26-10-6	1	10
Mayhue	11- 9-6	1	1,409
Strothers	11- 9-6	1	1,062
I. T. I. O.	11- 9-6	1	330
Gypsy:			
Cudjo	4- 9-6	3	619
Nevins	32-10-6	2	159
Carter Oil:			
McMan	11- 9-6	1	19
Magnolia:			
Varnum	32-10-6	3	573
W. F. Varnum	5- 9-6	1	38
Mid-Continent:			
Grayson	34-10-6	4	20
Saloche	33-10-6	5	371
Mid-Continent & Homaokla:			

(Continued on Page 223)

Eastern Market Shows Improvement

Lubricants and Wax on Firmer Ground. Gasoline Price Basis Remains Unchanged but Undertone Is Softer

By A. E. Mockler
New York Bureau, The Oil and Gas Journal

NEW YORK, Oct. 7.—Market sentiment in the East Coast area has shown a little improvement this week, with lubricating oils and paraffin wax working into firmer ground. Gasoline has undergone no important modification, and the price basis remains unchanged, although the undertone is still somewhat inclined to softness.

Perhaps the outstanding development of the week was the reported sale of a cargo of 64-66 naphtha and prime white kerosene at the Gulf at prices one-half cent under the established basis in both instances. Although the cargo is destined for France, the French buyer operated through a London firm which bought the gasoline and kerosene in the Mid-Continent Field, making the resale to the French buyer on an f.o.b. Gulf Coast basis. The shipment will go out through New Orleans.

Reductions in eastern crude oil prices this week have had no perceptible influence upon the refined products market yet, and no marked revisions in refined quotations are looked for, although it is possible cylinder oils and paraffin waxes may be slightly affected through lower production costs incidental to the crude cut.

Tank Car Gasoline

U. S. Motor has met with continued favorable demand during the week, and while movement is much smaller than last month at this time, refiners report sales are still running ahead of comparable 1928 totals. The market here is held at 8¾ cents by the leading interests, with 9 cents quoted at South Atlantic terminals in some instances. The market undertone is still showing some softness, and price cutting under the 8¾-cent level is by no means a rarity, although less general than a few weeks ago.

Eastern refiners are not carrying excessive gasoline stocks, and it is expected there will be a gradual curtailment of output over the winter. Refiners here are planning larger production of kerosene and fuel oils during the winter, although refinery stocks are fairly large at present. New consumption records on these oils are expected, notably on furnace oils, refiners carrying record volume of contract business for delivery over the next four to five months.

Considerable competition in tank car gasoline sales is still reported but leading interests are apparently expecting favorable development in that direction from the code of ethics. In fact, tank car competition has shown considerable change for the better within the past month or so, the principal source of complaint now being some of the alleged practices indulged in by marketers in an effort to boost their tank wagon sales.

Refiners in this area are running a larger proportion of premium grades of gasoline, and production of the higher quality motor fuel will be steadily stepped up during the colder months.

Tank Wagon Markets

No general revisions in tank wagon gasoline schedules developed this week. The feeling in tank wagon marketing circles is still somewhat uncertain, with the recent trend in refinery prices toward lower levels, some downward readjustment in tank wagon and service station schedules would not come as a surprise.

Marketers are still showing some perturbation regarding reports of unethical practices on the part of a few sellers in some parts of the East, and it is generally felt this angle will have to come in for thorough overhauling before next summer's motoring season.

With the code of ethics as a weapon to enforce fair play, refiners and marketers are showing a disposition to investigate thoroughly all reports of secret rebates and kindred practices, and the general feeling seems to be that considerable improvement may be looked for.

Consumption of gasoline throughout the eastern area is showing a seasonal decline, although sales are still materially ahead of last year at this time. In fact, it would not be surprising if eastern gasoline consumption would register gains of from 15 to 20 per cent for the year, based on the current volume.

Increasing demand for premium gasolines is a feature. The weather has been unseasonably cold, and with "cold weather starting" just in the offing, motorists are showing a pronounced disposition to shift over to the high-test quick starting motor fuels. The fact that the premium fuels command a price 3 cents over ordinary U. S. Motor does not appear to be any bar to increased demand, and the mere fact that motorists are willing to pay the price for a good fuel has caused some rather acrimonious comment among trade leaders concerning the uneconomic aspects of price cutting as a means to greater distribution. Independent marketers are still underselling the larger companies by from 2 to 3 cents on both "white" gasoline and the various tynes of premium gasolines, this price cutting being particularly marked in Greater New York.

Kerosene

Jobbing demand is on the increase, and tank car movement has picked up. Leading sellers are holding the market for water white firm at 7¾ cents, and while a little burning oil is still to be had at 7½ to 7⅝ cents, most sellers are within one-eighth cent of the 7¾-cent level. Jobbers are filling storage in anticipation of a good demand over the balance of the year. Consumption during the latter half of September and the first week in October has been much larger than looked for, and some distributors who put in early storage have come back into the market for replacements much sooner than expected.

Eastern refiners are getting a heavier export demand for kerosene and the larger quantities moving into foreign consuming channels are tending to bring about a better feeling in the domestic market. East Coast refiners are reported increasing their production slightly to take care of the seasonal expansion in consumption.

There have been no general revisions in the tank wagon kerosene market in this area. Demand is picking up, and tank wagon deliveries are showing increases from week to week as seasonal expansion in consumption develops.

Furnace Oil

Refiners are moving furnace oil in considerable volume, and demand is active in both tank car and tank wagon markets. A number of large coal distributing organizations in the East have added furnace oil to their line during the summer, and new business from these sources is running into considerable volume.

New installations of domestic oil burners have been very heavy in this area, and this expansion is naturally being reflected by a larger oil demand. Several refiners are carrying contracts booked in the fall of 1928 over through the 1930 season.

Diesel Oil

A steady undertone prevails in this division with a continued good movement reported. Leading refiners are still quoting $2 per barrel, in bulk, at principal East Coast refinery terminals. Contract movement with leading marine interests is well maintained, and considerable volume is also reported on spot Diesel. Reports of important new Diesel construction are interesting the trade. Thus far, the Diesel oil market in the East remains in the hands of the local refining trade, although it is reported that California Diesel oil can be laid down in the East at prices slightly under those named by eastern refiners.

Industrial consumption is holding up within well-defined channels. Refiners are getting a good inquiry for low grade Diesel oil for use in domestic oil burners, and business in this class of oil is expected to develop steadily with the advent of real winter.

Gas Oil

Recycled stock is moving in better volume, with the market displaying a fairly steady undertone. The leading seller is maintaining the market at 5¼ cents, in bulk, at refinery terminals, and is getting a good amount of business at that level. Other interests are quoting a range of 4¾ to 5 cents, and reported good volume.

Artificial gas companies in the East Coast area have materially increased their consumption of gas oil during the week. The East has been visited with a cold snap, and the use of gas for heating purposes has shown considerable gain.

Low grade gas oils are meeting with an active jobbing call, distributors coming into the market for stocks for delivery against their furnace oil contracts. Jobbers in many sections of the territory have already moved their early purchases, and with depleted storage stocks on hand have come back into the markets for replacements. Volume in this division is expected to run into record totals this year, in view of the sharp gain in oil burner installations in the East during the past summer and fall months.

Fuel Oil

Refiners continue to maintain the market of $1.05 per barrel, in bulk, at refinery terminals on the East Coast, with a steady movement reported at that level. Industrial consumption is steadily picking up with the advent of colder weather, while marine demand is holding at high levels.

The market undertone appears to have lost some of its firmness, and the outlook for a price advance before the close of the year is now rather remote. Interests which a short time ago were talking a possible mark-up are now of the opinion no price change can be made for some time, or at least until the domestic production situation is brought under better control. While the East Coast fuel oil market is well controlled, the possibilities of heavier receipts from other sections in the event of a price advance here are believed to be too great to permit of the maintenance of any higher price level in the East at this time.

Lubs

Cylinder stocks have come in for considerable more buying this week, and the market position has steadied somewhat. A number of the large eastern companies are reported to have bought heavily in the field this week, and this buying has stiffened refiners' price views considerably.

The market for 600 steam refined is held at 30 cents per gallon here, with 635 stronger at 32 cents and 650 steady at 36 cents per gallon. On 600 Pennsylvania flash, sellers quote 43 cents per gallon, with 630 flash quoted at 47 cents. Oil City E is held at 41 cents per gallon, with Warren E at 47 cents. Bright stocks are firmer at 60 to 61 cents per gallon for light 140-150, and 58 to 59 cents for dark 140-150.

Domestic consumers have increased their takings to some extent this week, and with a number of inquiries in the market, further buying is expected to develop. Export demand is also along broader lines, and shows indications of further expansion.

Red and pale oils are both holding up well on the spot position, with a good tank car movement reported. Domestic industrial demand has shown a little improvement, and there is a better movement into export channels as well.

Paraffin Wax

With crude scale working into firmer ground at 3⅜ to 3½ cents per pound for 122-124 a.m.p. the market for fully refined is likewise taking on a better tone. There has been a considerable improvement in domestic demand, and export sales are likewise heavier, particularly for shipment to Great Britain.

Petrolatum

Steady markets prevailed on both the white and amber grades this week, with a good inquiry reported from the domestic trade, as well as from export buyers. The reduction in eastern crude oil prices this week is not expected to have any appreciable bearing upon spot petrolatum quotations, jobbers declare.

Exports Markets

The deadlock which has existed for some weeks in the Gulf gasoline market was broken this week with the sale of a large cargo, believed to be about 8,000 tons, for shipment to France. The cargo was made up of 64-66 at 9½ cents and prime white kerosene at 6½ cents, both prices being a half cent under the established basis. The purchase was made through a London house which bought the oil in the Mid-Continent and resold to the French buyer. The oil will move out of New Orleans November 15 and December 15. It is believed in export circles here that further business of this kind may be looked for shortly.

A cargo of 400 endpoint gasoline was booked in California at 8½ cents for shipment to England the latter half of November.

There was an exceptionally heavy export movement of gasoline and naphtha from New York reported for the week ended September 28, exports of both oils being larger than the aggregate totals of the previous three weeks. Considerable bulk motor fuel is going out from this port, although it is understood that cased naphtha export sales are accounting for a large part of the movement.

England has come into the paraffin wax market for supplies in fairly liberal volume, and this demand has strengthened the market position. Inquiry for lubricating oils from the same source is also reported on the increase, with the market tone in slightly firmer position.

Moderate inquiry for both fuel and gas oils for export is reported locally, although it is reported that the Gulf and California markets are more active on these oils. Current low prices for fuel and gas oil are counted upon to move fairly large quantities into foreign consuming markets within the next six months, according to reports in local trade circles.

The export association met during the week in New York but took no action looking toward any revision in the Gulf export basis on either gasoline or kerosene, although the trade has been looking for some action in that direction.

Petroleum Exports

The following table shows principal ex-

(Continued on Page 223)

Practical Suggestions in Refining

By W. T. Ziegenhain

BOILER PLUGS MUST BE REPLACED PERIODICALLY

Tin plugs are often placed in refinery boilers as a tell tale and safety device against the possibility of an explosion should the water in the boilers run low. The importance of selecting plugs of good quality and the replacement of these plugs with the new ones periodically is pointed out by the United States Department of Standards.

In its usual form the fusible plug consists of an externally threaded bronze casing filled from end to end with pure tin, which has a melting point of about 231 degrees Centigrade. The plug is screwed into the boiler in such a position that it is about 1 inch or more above the dangerous low-water level, one end of the plug being on the water and the other on the fire side. If the water in the boiler falls below the level of the plug the tin melts and is blown out, thus releasing the steam pressure and serving to prevent burning and possible explosion of the boiler.

The attention of the bureau was recently called to the fact a boiler exploded which was equipped with such a plug. It was shown that this explosion had resulted from low water and consequent overheating of the boiler plates. This should have been indicated by the melting of the filling of the fusible plug in that region, but the plug was found to be unmelted and apparently sound. The plug was forwarded to the Bureau of Standards for determination of the cause of failure. A thorough investigation showed that the filling contained only traces of the original tin, embedded in a matrix of tin oxide, which upon test showed a melting point of 1,600 degrees Centigrade. This oxide was distributed in such a form and quantity that it held the full steam pressure and would not have melted before the bronze of the plug casing or even the steel of the boiler plates. Actually such a plug constituted a serious hazard instead of a safeguard.

A a result of this investigation a thorough study was undertaken to determine the causes of the formation of this tin oxide. It was found that as little as 0.3 per cent of zinc or lead in the tin caused a dangerous deterioration, which was eliminated by insisting upon the use of a tin of high purity, containing not more than 0.3 per cent total impurities.

The failure of the plugs to function was due to the presence of a refractory material in the fire end consisting principally of oxides of copper and tin and in some instances of CaO and MgO. It was shown that the formation of tin and copper oxides was the result of a partial melting of the tin filling and subsequent oxidation. The calcium and magnesium oxides were shown to have come from the boiler water through a leak in the plug because of incomplete bonding of the filling to the casing.

REFINERY EMPLOYMENT GAINS

Refinery employment reached a new high for the year in August according to the monthly survey of the United States Department of Labor. An increase of 1.6 per cent is shown in the number of employes compared to the previous month and an increase of 1.5 per cent is shown in the amount of the pay roll. Compared to a year ago, the number of men was 17.5 per cent higher and the amount of the pay roll was 15.1 per cent higher.

At these higher totals, new peaks were established, the August figures being higher than any month for the past three years and above the average of 1923, a year which has been pointed to as a very favorable one from the standpoint of refinery employment.

USE DIRECT EXPANSION TO MAKE LOW COLD TEST BRIGHT STOCKS

The manufacture of low cold test bright stocks and neutrals is being given considerable attention at present as part of the general program of improving the quality of lubricating oils. This problem is of particular interest to Mid-Continent refiners, who, over the next 12 months will probably spend more than $5,000,000 for additional equipment to meet these demands. Mid-Continent refiners have underway numerous investigations with respect to enabling them to manufacture low cold test lubricants.

These investigations might be divided into three major classes. Some of them are buying Gulf Coast crude and reducing it or are purchasing the finished or unfinished lubricants from this crude and blending these oils with their own production to make low cold test oils. This method has been in general practice for a considerable time but due to the fact that this method is costly and sacrifices have to be made in the flash and fire specifications and the viscosity-temperature relation, other means of securing a low cold test are being favored.

Investigate Different Crudes

The next logical step has been to test all different kinds of crude produced in the Mid Continent in hopes of finding some which will produce low cold test products without an overbalancing loss in some other factor of quality. In addition, the advantages often gained in blending definite amounts of two or more different kinds of crude is being investigated and considerable work is being done on Winkler County, West Texas crude in this connection. The reduced bottoms from this crude, mixed with those from Oklahoma City crude or Seminole crude in equal parts is said to yield lubricants of a lower cold test than the general run of Mid-Continent crudes and the viscosity-temperature relation of the finished oils is also better than the average.

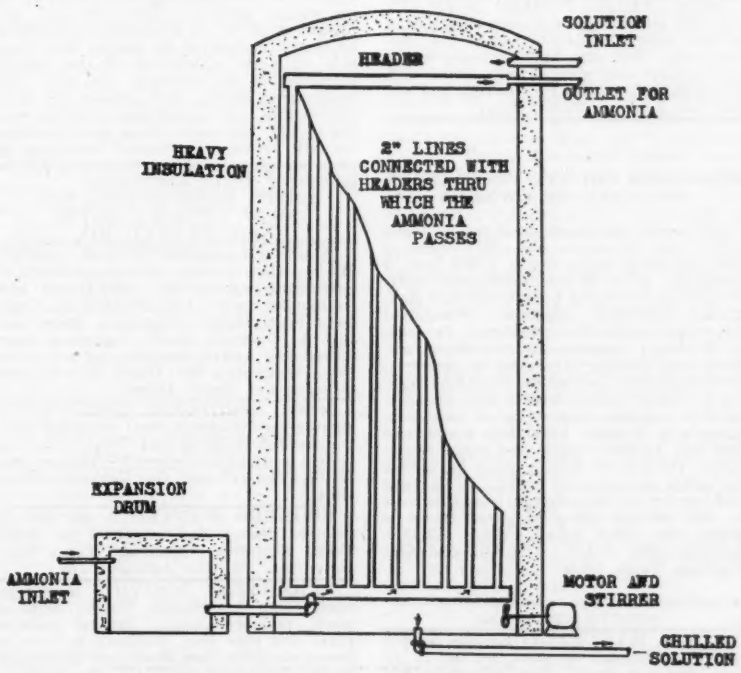
Naturally, the cold test of the finished products are dependent upon the processing of the oil as much if not more than the kind of crude chosen as the source. It is this fact that has called for the development of means of chilling the oil to very low temperatures to facilitate the removal of all but traces of the wax.

This problem is not so difficult from the standpoint of supplying adequate and effective refrigeration but because of the great difference in the nature of the wax resulting from many kinds of crude, differences in the state of the wax, whether amorphous or crystalline, differences in the time required for crystallization, etc., the choice of equipment and the manner of chilling calls for considerable study.

Direct Expansion

A type of chiller utilizing the direct expansion of ammonia to arrive at the low oil temperatures is sketched below. This type is being commercially applied in a Mid-Continent refinery at present with favorable results. Its application to Mid-Continent oils and practices has required some changes but the principle of direct expansion for the production of low cold test bright stocks and neutrals appears to be one solution of the problem.

The essential parts of the chiller include a large, well-insulated vertical tank, a small insulated expansion drum, a system of small vertical pipes connected by headers at both ends, and a stirring device in the base of the chilling tank to keep the wax from settling out. The desired capacity of the unit will determine the size of the respective parts but for commercial work the chilling tanks are being made approximately 7 feet in diameter and stand 20 feet high. These are completely insulated with 8 inches of efficient heat insulating material, and then weatherproofed. Inside the chilling tank are numerous 2-inch tubes connected by common headers, one resting about 3 feet from the bottom of the chilling tank and the other near the top of the tank. Approximately 2,100 feet of surface is provided in each chilling tank by these tubes.



General method of applying the principle of direct expansion of ammonia to produce low cold test bright stocks and neutrals. Several units such as shown here may be connected in series and the process of chilling carried out in steps, permitting flexibility in the operation and exacting control from the standpoint of time of chilling.

Use Stirring Devices

A stirring mechanism is used to keep the wax in suspension as it tends to precipitate out of solution during the cooling. A small motor belted direct to a rotating shaft and paddles inside the chilling tank supplies the agitation.

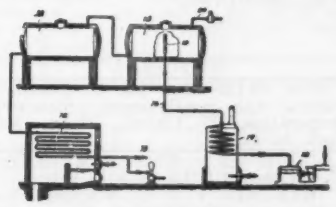
The expansion tank into which the ammonia is allowed to expand is located near the chilling tank. This is heavily insulated and relatively small. The anhydrous ammonia gas, compressed to approximately 160 pounds is expanded into this chamber, the outlet for the gas being up through the 2-inch tubes and into the upper header from which it is pulled into the compressor for recirculation. A slight vacuum on the outlet end of the header further increases the cooling effect of the ammonia and the temperature in the expansion drum and base of the chilling tower may go as low as minus 65 degrees Fahrenheit. The oil temperature is between minus 35 to minus 40 in producing a 150 viscosity bright stock from the general run of Mid-Continent crudes.

Brine Impractical

At these low temperatures, it would be impossible to use a brine solution for circulation and a calcium chloride solution would be difficult to pump. By the elimination of the brine solution, lower temperatures are secured, however, through its removal the system becomes more sensitive. Because there is no absorbing body of liquid to absorb the fluctuations in the operation of the compressors, absorbers, etc., more attention must be paid by the operators to the process of cooling. The matter of a high loss of ammonia gas necessitating extra heavy, and tight equipment is also a factor in the erection of such a plant.

Recent Patents

1,670,037. Art of Heat Conversion of Hydrocarbon Oils. Frank A. Howard and Nathaniel E. Loomis, Elizabeth, N. J., assignors to Standard Oil Development Co., Elizabeth, N. J., a corporation of Delaware. Filed November 28, 1921. Serial No. 518,199. 19 Claims. (Cl. 196—51.)



1. In apparatus for the conversion of oil, the combination of a coil, means for forcing oil therethrough, means for applying highly heated combustion gases to the coil, an enlarged unheated chamber into which the coil discharges, said chamber being provided with means for hindering the escape of heat and having a single outlet, a second enlarged chamber into which the first mentioned chamber discharges, and means for supplying the waste combustion gases to heat the second chamber after having been applied to the coil.

11. The process of converting hydrocarbon oils into hydrocarbon oils of lower boiling point which comprises forcing the oil through a highly heated confined passage with a velocity sufficient to prevent a substantial deposition of coke whereby the oil is brought to a cracking temperature, discharging the oil into an enlarged chamber while confining therein the contained heat of the oil to maintain it at cracking temperature, passing the prod-

(Continued on Page 223)

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WANT OIL DEVELOPMENT, cheap lease, large area in Pushmataha County. For particulars write I. N. Billingslea, Sobol. Okla.

FOR SALE
Canalization of the Ohio River from Pittsburgh to Cairo has been completed. Several large companies have recognized the strategic location of the upper Ohio Valley for refinery sites and have refineries under construction at present. We offer for sale one of the most desirable locations for a refinery in this district, having ample wharf facilities, good rail connections, property is serviced by two large gas companies, large electric company and is near two pipe line pump stations. Land is level and is well above high water mark. For prices and further particulars address LAUGHNER REAL ESTATE COMPANY, 1502 Commonwealth Bldg., Pittsburgh. Pa.

FOR SALE—Or partner wanted. Patent of first visible gasoline pump. All others are infringments. Write for information. Lee Wilson, Olvey, Ill.

REPUTABLE PUBLIC UTILITY will buy natural gas properties consisting of pipe lines and distribution or distribution only. Will also build systems where gas supply and market will stand full investigation. Write Box D-165, The Oil and Gas Journal, Tulsa, Okla.

OKMULGEE COUNTY PRODUCTION
FOR SALE BY OWNERS

338 acres, 16 Booch sand wells, depth 1,700 feet, 10 years old. 160 acres, 4 Dutcher sand wells, depth 1,900 feet, 5 years old. 17 to 20 bbls. production daily. Properties are being pumped by one man. Plenty undrilled locations. Wonderful opportunities to raise production by deeper drilling, cleaning out, installing air. Well now drilling very close to property. Good equipment on leases, including pulling machine, tractor with winch, also No. 30 Star machine with string of tools from 12-inch to 6-inch. 1,300 feet 8-inch and 300 feet 10-inch casing and other equipment. Reason for selling, must have cash for other development work. If you are looking for oil investment, look this over as the salvage value of these leases is worth the price asked. Price $25,000. Address Box D-171, The Oil and Gas Journal, Tulsa, Okla.

TULSA MANUFACTURER'S Agency wishes additional account selling to oil and pipe line trade. Best references and will give active representation. Available for interview at Petroleum Exposition. Write Box D-133. The Oil and Gas Journal, Tulsa, Okla.

BUSINESS OPPORTUNITIES

YOU can make BIG money helping to develop the gold mining industry of Colombia, South America. For particulars address Davidson, 201 First National Bank. Denver. Colo.

WILL GIVE 6,000-acre lease Arkansas land for 1,800-foot hole. Strictly "wildcat." Good geology. W. C. Hammer, Claremont. Ill.

160 ACRES TO LET on a 30 days drilling contract, out of the south part of Sec. 12, Blk. 9, H. G. N. Ry., Pecos County, Texas. Want $10.00 bonus, $2,000.00 put up for specific performance. Part royalty for sale, Phillipps Co., lease, Reeves and Loving Co.
Caroline Tyler, Goodnight, Texas.

I VERILY BELIEVE NO OIL INVESTMENT HAS EVER BEFORE BEEN OFFERED ALONG SIMILAR LINES
Our 2,427 foot well is producing 43.9 paraffin base oil on a 100 acre lease, the first oil developed around the Great Waskom Gas Field, and we are justified in believing we have opened a new oil field. We have a 200 bbl. refinery almost completed that enables us to realize $6 per bbl. Have expended over $40,000 and require $2,500 to complete and commence marketing refined products. Not a promotion, no watered stock, just a Limited Partnership where your money goes as far as ours and you can come in now with $500 or more, on the same basis as if you joined eight months ago before oil discovery. We are not promoters but experienced oil developers and offer NOT A SPECULATION but a legitimate investment with limitless possibilities. Better wire your order.
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DESIGNING ENGINEER
Firm specializing on Pipe Stills and complete refinery installations has opening for experienced designer and estimator. Permanent opportunity for technical graduate possessing initiative, experience and personality. Box No. D-143, The Oil and Gas Journal, Tulsa, Okla.

SALES ENGINEER
An opportunity for a permanent position for an experienced refinery engineer capable of representing this company in its selling division. The successful applicant must be an authority on refining processes, competent to discuss new projects with the executives of the largest refineries in the industry. He must also have sales ability and personality that will enable him to negotiate sizeable contracts. If you have these qualifications we will arrange a personal interview at your convenience. All applications will be considered strictly confidential.
SMITH ENGINEERING CO.,
107 W. LINWOOD BLVD.,
KANSAS CITY. MO.

WANTED PRODUCTION FOREMAN—Gang pusher. Recent graduate of petroleum engineering. Must know how to handle water, typical of Gulf Coast conditions. Modern four-room house furnished. Give all details regarding experience and salary expected, or no attention. Write Box No. D-170, The Oil and Gas Journal, Tulsa, Okla.

MECH. ENGINEER capable of designing and construction cracking stills wanted for work abroad. State complete record and salary expected. Address Box D-168, The Oil and Gas Journal, Tulsa, Okla.

BROKERS WANTED to sell our attractive leases and royalties in many Texas Counties. National Land Company. Box 73, San Antonio. Tex.

PERMANENT POSITION in general engineering department, Tulsa; scope of work, refinery design, natural gasoline plant and pipe line. Opening for one refinery designer, two first-class draftsmen. one planner and estimator, one material man to take off quantities from drawings, make requisitions, etc. Write Box D-146, The Oil and Gas Journal, Tulsa. Okla.

HELP WANTED

THE TECHNICAL DEPARTMENT of a large marketer of petroleum products in the Middle West has an opening for a capable, energetic young university graduate with chemical engineer degree, or at least two years' chemistry. His major experience should be petroleum technology, particularly greases. Apply at once, giving age, education, experience (full particulars), references, salary desired, etc. Write Box D-150, The Oil and Gas Journal. Tulsa, Okla.

ENGINEERING DRAFTSMEN
Several openings are available for engineering draftsmen experienced in refinery design and especially in large refinery piping layouts. Apply by letter only, outlining your past experience and giving all essential information. Applications will be held confidential and personal interviews arranged later.
SMITH ENGINEERING CO.,
107 W. LINWOOD BLVD.,
KANSAS CITY. MO.

SALESMAN WANTED—Experienced in selling pipe coatings, maintenance paints, etc., to gas and oil institutions; very attractive proposition to salesmen having entree to large buyers; will interview during convention. Address Box D-161, The Oil and Gas Journal, Tulsa, Okla.

POSITION WANTED

SALES ENGINEER with fifteen years experience in Mid-Continent selling refining companies. Have entree to all large companies. Age 39. Write Box D-124, The Oil and Gas Journal, Tulsa. Oklahoma.

ACCOUNTANT-ATTORNEY competent to handle accounting and title records of producing or royalty organization desires new connection. Reasonable salary to commence with. Will consider law office work. Write Box D-142, The Oil and Gas Journal, Tulsa. Okla.

ENGINEER, RESEARCH AND SALES, experienced designer and operator, would like engineering and sales promotion work (not peddling) introducing new processes or equipment of merit; where opportunity exists for a skilled, scientific investigator with business sense; of good personality and acquaintance throughout the middle west. Address Box D-163, The Oil and Gas Journal, Tulsa, Okla.

ENGINEER AND EXECUTIVE, with refining and producing company. Experienced in design, construction and operation of refining and gasoline plants; also reports, appraisals, estimates and purchases. Broad scientific training and business experience. Address Box D-162, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST. Over two years field and subsurface experience with major companies in Mid-Continent area. Desire position with oil or royalty company. Write Box D-167, The Oil and Gas Journal, Tulsa, Okla.

MATERIAL MAN competent to handle warehouse department desires new connection with oil company. Competent of taking charge of field inventory work. Write Box D-164, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED LAND MAN, leasing, rights of way and claims. Would like to have place with oil or gas company. Go anywhere. Good references. Write Box D-169, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST—Over two years field and subsurface experience with major companies in Mid-Continent area. Can operate magnetometer. Desire position with oil or royalty company. Write Box D-167, The Oil and Gas Journal, Tulsa, Okla.

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TEXAS LEASES 25 cents per acre and up in several interesting counties. Own over 75,000 acres. General Investment Company, 321 North St. Mary's Street, San Antonio, Texas.

20,000 ACRES. SOLID BODY. Six miles from railroad. Western Jeff Davis County, Texas. Ten year paid up lease one dollar per acre. Will sell in fee four dollars per acre. Good geology. Come here and check this up.
W. H. Colquitt, Owner
Box 274, Marfa, Texas.

FOR SALE OIL LANDS, LEASES AND ROYALTIES in Michigan, Oklahoma, Texas and New Mexico. Wire or write R. O. Zielinski, 12836 Wood Street, Blue Island, Ill.

SOUTHEASTERN NEW MEXICO leases. Lea, Eddy, Chaves Counties. Prices and maps on request. Orcutt-Harris & Co., Colcord Building, Oklahoma City, Okla.

ACTIVE LEASES and royalties for sale in Howard, Glasscock and adjoining counties in West Texas. Write or wire W. T. Mann, P. O. box 97, Big Spring, Tex.

WEST TEXAS LEASES for sale in Irion, Menard, Concho and Tom Green Counties in tracts of 320 to 5,000 acres. This is sweet oil territory. Address H. B. Opp, Menard, Tex.

FOR SALE—100 acres of a 500-acre lease, 4 miles east of Bulcher Field in Warren's Bend, Cooke County, Texas. To help support cost of well to be drilled in heart of this 500-acre block. Depth of well to be 2,500 feet; will be spudded in approximately 30 days. This acreage will be almost an offset to our well. Wire or write H. W. Scott, 408 Burt Building, Dallas, Tex.

18,000 acres solid body in Bailey County for oil lease. 8,000 acres with 96 foot rig up in Bailey County for drilling contract. Write Sullivan and Wolf, Sudan, Texas.

HAVE TEN ACRE TRACTS in Fee, Leases and Royalties, west Texas oil fields. Joe Cunningham, Big Spring, Tex.

LAND, Leases, Royalties and Drilling Blocks in proven or unproven territories, Winkler, Pecos, Ward, Loving, Reeves, Culberson and adjoining counties. Wire or write.
H. F. Anthony, Anthony Bldg.,
Pecos, Texas.

OWNERS of approximately 11,000 acres in Clark County, Kansas, would like to get in touch with oil producing companies desiring to lease. Address Box D-113, The Oil and Gas Journal, Tulsa, Okla.

LEASES FOR SALE
Located in the heart of Alberta's Oil activity. Priced right by owner. Northern Investments, 303 Alberta Corner, Calgary, Alta.

OIL LEASES AND ROYALTIES. Schleicher, Pecos, Ward and other counties. West Texas land and ranches. J. L. Ferguson, Rust Building, Box 462, San Angelo, Tex.

I have absolutely proven 10-acre lease in heart of Oklahoma's second largest high grade oil pool. Will sell or let for drilling. Production every direction; no dry holes. Five hundred barrel well offset one corner just in. Also have good offset leases for drilling or sale in greater Earlsboro Field. Sterling Anderson, Box 151, Earlsboro, Okla.

WILL SELL LEASE ON TOPOGRAPHICAL HIGH N. W. SECTION 7-12N-2 East, Lincoln County, Oklahoma, for $4,000.00. Also lease N. W. Sec. 19-11N-3 West, near big production. G. A. Minnich, Carroll, Iowa.

FOR LEASE—25,000 acres prospective oil land in Coahuila, Mexico. Rights confirmed to owner by Mexican government. S. R. Gonzales, Naranjo 2, Altavista, Tampico, Mexico.

LEASES—PRODUCTION

FOR SALE—Drilling blocks, commercial blocks, royalties, leases, checkerboards, in Hodgeman, Ford, Finney, Trego, Gray, Seward, Stevens and Morton Counties, Kansas. Lou Meyers, Box 471, Dodge City, Kansas. Office Phone 122. Reference any Southwest Kansas bank.

NEW MEXICO LEASES
I offer some real bargains in cheap leases in several counties in New Mexico with perfect titles. All rentals run at 5 cents per acre. Write for lists, maps and descriptions. Frank P. Strickland, Sapulpa, Okla.

BUY AND SELL Texas oil leases, royalties and drilling blocks. Ed Willman, 708 Majestic Building, San Antonio, Tex.

DRILLING blocks, leases, royalties in Ellis, Trego, Rooks, Norton Counties. Write or wire W. J. Madden, Hays, Kans.

ECTOR COUNTY well drilling, other locations. Leases and royalty at prices soon to double. Other bargains. Anderson, Linz Building, Dallas, Texas.

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CAPITAL — An experienced, dependable broker will aid in financing propositions of merit. Amster Leonard, East Orange, N. J.

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FINANCE YOUR OWN project with shares bonded. Quickest, most satisfactory known method of raising capital. Information free. Bankers Interstate Security, Electric Bldg., Denver, Colo.

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WILL BUY oil royalties.
James H. Dugan,
El Dorado, Ark.

OIL LEASES, royalties, producing royalties, and drilling blocks. O. O. Milliken, Box 63, Oklahoma City, Oklahoma.

ROYALTIES in Ness, Trego, Rice, Sedgwick, Butler, Cowley and other Kansas Counties under or near drilling wells, some on core drilled blocks. Also Royalties in Winkler, Pecos, Ward, Presidio and other West Texas Counties. Tests and maps. James R. Haynes, Grantville, Kansas.

FOUR PERPETUAL and Fully Participating Mineral Deeds under 2,326 acres diversified as follows:

Gaines County, Texas ..	246 acres
Kendall County, Texas ..	1,600 acres
Custer County, Oklahoma	320 acres
Jack County, Texas	160 acres

All four deeds paid for in full forever for only $50.00 and we pay for having your deeds recorded in your name in the various counties. You receive your portion of all lease rentals and bonuses as well as oil, gas, and other minerals. Prospectus showing maps, opinions of title, etc., gladly mailed upon request.
ROYALTY A MONTH CLUB
City National Bank Building
Wichita Falls, Texas.

WILL SELL 10-acre tracts out of 10-year lease covering the south 154 acres of Section 12, Block 122, Pecos County, Texas; price $15 per acre. Close to Republic Production Co., Humble Oil & Refining Co., Pure Oil Co. and The Texas Company blocks. Send money to San Angelo National Bank. Will furnish assignment, copy of lease and copy of attorney's title opinion. M. Stein, St. Angelus Hotel, San Angelo, Tex.

SEND NOW FOR attractive list of leases and royalties owned by us in over ten live Texas Counties. Alamo Investment Company, Box 774, San Antonio, Texas.

ROYALTIES—PRODUCTION

HAVE OPTION on one-sixteenth royalty 320 acres. Now under lease. Forty miles from world's best helium field. Can not handle alone. Will sell one thirty-second at option price. This is a real buy at $1.25 per acre. For complete data address H. C. Peterson, Craig, Colo.

YATES POOL ROYALTY
WILL sell 1 acre or more Sections 10 and 19, Blk. 194, Pecos County at $250.00 per acre. Glen Myers, San Angelo, Texas.

J. A. WOLF & COMPANY
127 N. Dearborn, Chicago, Illinois.
We deal in Oklahoma Royalties exclusively.

PRESIDIO COUNTY, TEXAS
The Texas Pacific Coal & Oil Co.'s well, Section 83, Block 8, now spudded and drilling ahead. Test reported to go 4,000 feet if necessary.
ROYALTY FOR SALE
You are now offered at $45 each a 6-acre perpetual oil and mineral deed, 1 acre each tract, and spread over six tracts containing about 2,880 acres.
The description—all sections or tracts —1-2-27-28-30, Block 8; 3, Block 7. All solid.
To purchasers: You get recordable royalty deed, abstractor certificate title and Presidio County map.
Presidio County should get a big play. That means advance in prices.
If interested, address Atlas Royalty Co., Box 762, San Angelo, Tex.

ROYALTY and Leases in Western Oklahoma and Southwestern Kansas for sale at low prices. Sain & Company, Forgan, Okla.

FOR SALE—New and old settled oil and gas production, blocked acreage, shallow field. Anderson County, Kansas. W. L. Morris, Box 314, Garnett, Kans.

FOR SALE—Lea County deeded oil royalty. CASH paid for Lea County Oil Leases.

FOR SALE—Southeast N. M. oil leases EASY TERMS, small investment. Monarch Inv. Co., Roswell, N. Mex.

ACTIVE WEST TULSA ROYALTIES $8 per square mile. Big company operation. See maps and bulletins. R. R. Fisk, Box 1214-B, Wichita Falls, Tex.

SHALLOW PRODUCTION FOR SALE
Have well making 8 barrels. Depth 500 feet. On 50-acre lease in Shackelford County, Texas. Wonderful drilling possibilities. On pump and fully equipped with two 100-barrel tanks. Pump and other equipment. Other wells at same depth in same sand are making from 20 to 40 barrels on adjoining leases. Can also acquire additional acreage. With the drilling of a few wells this lease could easily be made very valuable. For quick action will sell reasonably. Write or wire. H. W. Scott, 409 Burt Bldg., Dallas, Tex.

PERPETUAL ROYALTY INTERESTS
TWENTY DOLLARS WILL BUY perpetual royalty deed covering 640 acres in Hudspeth County, Texas. For information write William J. Rittinger, Box 25, Wilkinsburg, Pa.

PRODUCING ROYALTIES
$500 to $50,000
Also choice acreage in the Oklahoma City Field. Investments of $500 and up. W. M. Gallagher, P. O. Box No. 254, Oklahoma City, Okla.

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CHARTERS—Delaware best, quickest, cheapest, most liberal. Free forms. Colonial Charter Co., Wilmington, Del.

DELAWARE incorporator. Charters, fees small, forms. Charles G. Guyer, 901 Market St., Wilmington, Del.

REAL ESTATE

FOR SALE—Several tracts of mineral rights. Have one tract of 16,000 acres, another of 715 acres, which have been core-drilled and open pitted. Our geological report gives 240,000,000 tons of Rock Asphalt on the large tract and 4,000,000 tons on the small tract. For complete data address
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58,000 ACRES deeded and leased land, Northeast New Mexico. Fine grass, running water, good improvements. Sell worth the money. McNabb Land Co., Box 1231, Amarillo, Tex.

IDEAL HOME in the perfect setting; never-failing lake, lots of fish, fruit, county seat. Real location for fur farm or tourist camp, near oil fields, 7½ acres. Federale route 50. Owner, W. L. Brown, West Main Street, McArthur, Ohio.

FOR SALE—Model cattle ranch, on top of the Ozark Mountains. An estate of 490 acres, including two miles of White River. Highly improved; modern in every way; complete in every detail. Very productive, one-half in cultivation. Ideal all-year-round home. Ten room modern house with heat, light, baths, and running water. Cash or terms. Write owner, Charlie H. Clouston, Rogers, Ark.

WEST TEXAS OIL lands. Fee, lease, royalty. Joe Cunningham, Big Spring, Texas.

FOR SALE—3,200 acres 2½ miles frontage on state highway Lake Charles to Shreveport and K.C.S. railroad; 5½ miles southeast De Quincy, junction K.C.S. and Gulf Coast Lines, 15 miles northwest Lake Charles. $7.50 per acre, owner reserving one-sixteenth royalty. Will lease $1. per acre. This lie in territory where considerable land has been leased recently. Leon Chavanne, Inc., Realtor-Insurors, Lake Charles, La.

FOR SALE—2,100-acre estate with proven vein of bitumen asphalt 16 feet thick, tested for road surfacing and roofing, only one-fourth mile from railroad. If interested, complete information, samples and price will be furnished. Address W. C. Pickens, Poteau, Okla.

PUBLICATIONS

KENTUCKY OIL JOURNAL, devoted to the development of the oil and gas resources of Kentucky, and edited by Guy C. Bell, trained oil field reporter; published weekly at $2.50 per year. Accurate reports; independent policy; constructive and informative. Get all of the news while it is hot. Kentucky Oil Journal. Owensboro, Ky.

FORGINGS

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W. P. PAUL CO.,
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OUR EUROPEAN OIL FINDER is available for making drilling locations. The manufacturer of this instrument guarantees successful drilling locations. D. C. Oliphant, 19 West 44th Street, New York.

OIL AND MINERAL located with radio activity method. Have found several structures in Oklahoma and adjoining states. Need party lease or finance. Good references. Sievers, 1307 South Lawton, Tulsa, Okla.

OIL LOCATED before drilling. Geophysical method. Toggodometer Instrument; take pay in oil. No oil, no pay, except traveling and testing expenses. 95 per cent accuracy. O. P. Coffin, Caddo, Tex.

OIL INDUSTRY PRINTING

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township books, well records, etc. Request on your letter head gets free catalog. Old Press, 215 East Third St., Tulsa, Okla.

(ADDITIONAL CLASSIFIED WANTS ON PAGE 223)

Good Weather Aids Chicago Market

Fair Number of Additional Instructions on Contracts as Result. Bulk of Spot Business Went at 7 Cents

By J. B. Waldo

CHICAGO, Oct. 7.—The weather was like summer over the week-end and local stations reported they had a good gallonage. The result in the gasoline market was a fair number of additional instructions on contracts. The spot business was light on Monday, but will probably show an improvement tomorrow as Tuesday is now a much better day in this market. Some of the instructions were wired and asked for prompt shipment. Gasoline was freely offered for resale by refiners, some of the less desirable material being offered at 6½ cents, Group 3, while an eighth to a quarter more was asked for the full U. S. Motor for resale. Major refiners continued to quote spot prices of 7¾ cents but secured very little business at that price. Other sellers were asking 7 to 7¼ cents, but the bulk of the spot business went at 7 cents, Group 3, for U. S. Motor gasoline.

Kerosene

Kerosene was very quiet and prices were sagging in spite of the quotation made by major refiners of 5½ cents. This price was deeply cut by other sellers. Furnace oils were under the influence of a return of summer and while the prices show little change an abundance of material is being offered by both refiners and distributors and even large consumers. Distillates were offered very freely and buyers stated their best sources of supply were the distributors who had bought freely and could not deliver to their trade. Some have accumulations on track which they cannot take in and which they are glad to unload at usually a fourth of a cent under the prices asked by refiners.

Gas oil was also offered more liberally but not as freely as distillate. Refiners and their agents are holding a good distillate at 4 cents and a good gas oil at 3 cents to the trade.

Fuel Oils

In the case of industrial fuel oils much the same conditions prevails today. There are several local consumers who purchased in quantities earlier at prices much below today's level. This oil is coming forward more rapidly than it is consumed. Some, including several of the steel companies, have cars on track for which they have no room and some of this fuel oil is being resold. Under such conditions buyers are waiting to see what may happen. There was no quotable change in prices as the regular sources were holding their former prices today and expected to be able to maintain them until colder weather would bring an increased demand.

Increased Consumption

Gasoline transactions last week were very largely of a routine nature. There is no fault to be found with the consumption which is running steadily ahead of last year at this time but shows only the seasonable decline from the peak months of the touring season. Several of the largest distributors in this territory report their gallonage is very good. There is nothing in the situation to cause the distributors to do more than replace their drawings on stocks from time to time as they need supplies. Many jobbers have run their stocks down to their winter level or close to it and they see no reason in present conditions or the outlook for the immediate future to cause them to order in excess of their present needs. Gasoline is being moved along from refiner to consumer through the usual trade channels. There has been a very considerable change in these channels and the change is very largely of such a nature that it decreases the volume of gasoline moved through the spot market.

Purchases of established jobbing businesses and the mergers in the industry have changed a large number of accounts not only from the spot market to but have also taken a good many contracts away from one refiner and turned them over to another as a part of the business of the purchaser. The position of the sales manager for the average refiner has been made much more difficult not only through the loss of contracts but the actual reduction in the number of possible customers from whom he may seek to secure either spot orders or a marginal contract. The result is just what might be expected and that is the building of new stations not by the independent jobber but by the large integrated companies and each new station built by these companies is only an outlet for that company, not a possible customer for any other refiner. Sales managers complain they no longer have a list of possible buyers from whom to seek business. "There are only the bootleggers left for me to sell." was the remark of the manager of bulk sales of one of the large integrated companies.

Control of Outlets

The problem being the old, old one of securing buyers for the products of the plant, the race for business is now one for the control of the outlets. Various plans have been formulated and tried out in practice. The marginal contract was one of these and the Code of Ethics, though its emphasis on the integrity of contracts, is endeavoring to make this method of securing a list of steady customers more useful. The exclusive franchise contract was another and the authorized agent agreement still another but the trouble with all of them is that they fail to secure entirely and permanently an outlet for the gasoline refiner. Periodically these contracts have to be renewed and this is becoming more and more difficult in the face of increasing competition. No sales manager will give out information regarding the number of contracts that he fails to renew each season although he might give the number of new contracts closed during the same period. The lack of entire success in renewing all expiring contracts is shown by the many reports of margins guaranteed in excess of the normal 4 cents or of special financial favors granted to desirable accounts.

The present accepted theory of securing refinery outlets is that enough stations must be owned to assure the refinery an outlet for at least the volume of its products at which that refinery can operate at a profit. This is in a sense a reversal of the usual procedure in chain store operation which is to build up distribution and then purchase the factories which supply the chain store organization with its merchandise. This result is due to the different beginning. The average chain store system began with some progressive retailer who was able to expand his business usually with the assistance of one or more manufacturers and wholesale distributors until that chain of retail stores was in position either to buy out or merge with the manufacturer or to establish its own manufacturing industry. For some reason the gasoline business has worked the other way. There have been several attempts made to combine independent jobbers to own their own refinery but the number of successful businesses on this line are very few, and largely local.

Spot Market Poor Basis

All this changing around of accounts has made the so-called spot market a very poor basis on which to formulate prices. In the Chicago market during last week, the major refiners were holding their spot price for U. S. Motor gasoline steady at 7¾ cents Group 3, but with one exception they did not claim to have made any sales at that price. Several of the very largest integrated companies stated they had done no spot business. Yet they claim 7¾ cents is their market price for spot sales. On the other hand there were quite considerable sales made to spot buyers of U. S. Motor gasoline at 7 cents and those who catered to that business stated it was very difficult to sell at 7¼ cents. Certainly the bulk of the spot sales, by a large percentage, was made at a range of from 7 to 7¼ cents. There are occasional exceptions to any range of prices. Some sellers were anxious for business and would have and did sell occasionally at 6⅞ cents and one large order over the month was placed at 6.85 cents, Group 3. These prices were paid by jobbers for good, sweet material with the full specifications. As the head of one large marketing organization said, no spot buyer of good credit record, needs to pay more than 7⅛ cents. That was last week. It may be a little different this or next.

The reduction in crude output in some of the pools may assist some refiners who would like to do so, to reduce their runs. At least some of them will no longer have to take the full amount of crude called for in their crude contract and can cut down their runs accordingly. One refiner was asked why he sold his gasoline at 6¾ cents to brokers. His reply was that he had to. He was as anxious for higher prices for gasoline as any one could be. He said he would sell his gasoline to any one of those who blamed him for what he had done at 6¾ cents and be glad to see them sell it again at 7¾ cents but for himself the best price he could get was the price at which he had sold it and there were others who had sold at even lower prices than his. So if for any cause the volume of gasoline refined is reduced, with the present and assured consumption for the next two or three months there is always a possibility of an upward movement in the market but buyers believe the chance is slight. Lower prices are not wanted by anyone so far as can be learned.

New Grade of Ethyl Gasoline

The Standard Oil Co. of Indiana is putting out a new grade of Ethyl Gasoline at its stations. No announcement has yet been made but samples have been tested and they indicate it will be of a grade approximately 60-62 400 endpoint. It is sold at the stations already supplied with this better Ethyl Gasoline, at the same price as their former grade. It is understood, that the announcement of the new gasoline will be made as soon as the stations are all stocked. Motorists who have tried it claim that it is a very "peppy" and smooth running gasoline. This movement on the part of the largest distributor in this territory shows the tendency towards better motor fuel and that there is a real demand for such gasoline. There are still some motorists who switch from U. S. Motor to a higher gravity with the first cold weather but the demand here for these higher gravities is much less than formerly and is not increasing while the consumption of the anti-knock gasolines is growing. The situation to the east of this territory is still very much unsettled. In Michigan the operation of the anti-discrimination law has tended to reduce price cutting by the larger companies as the interpretation of that law, according to a Michigan oil man, has been that if the owner of several stations makes a reduction at any one of his stations he must make the same reduction at all of his stations. The market for U. S. Motor gasoline delivered at Detroit is now close to 10 cents which would be 6 30 cents Group 3. In Ohio the Standard Oil Co. of Ohio has made a number of local reductions in the tank wagon prices to meet local competition. Gasoline is freely offered from refineries possessing differential advantages at below the Group 3 market.

Kerosene Quiet

Kerosene was very quiet last week but the price for the 41-43 gravity closed a little firmer than during the middle of the week owing to some export buying. The demand was not good at any time here. The buying was simply scattering cars.

Furnace Oils Light

Furnace oils were much more quiet last week. This condition was expected in the trade and was welcome by most oil men who had a very active spell in trying to meet the demands of their customers for immediate filling of their tanks. This demand which followed the cold snap and frosts over much of the territory had not been provided for by some of the local distributors. In some cases it was not that the distillates had not been ordered but the refineries had been slow in shipping. One of the local refineries has a large amount of September material still to go forward. The price on most of this delayed distillate is around 3¾ cents. In several known instances the distributors have been obliged to purchase from other sources while waiting deliveries. It was partly the delay in shipments that caused the very active demand. In the long run these dealers will need just that much less distillate. Right now the business is light as most of the consumers' tanks have been filled and further supplies will not be needed by the average home owner for a month. The dealer can now replenish his stocks from the delayed shipments and will not need to purchase more material for some weeks in a great many cases. Offerings by refiners have been more liberal and prices are, as a result, not quite as firmly held by refiners who have been forcing the market a little too rapidly. There really seems to be a good deal of distillate available. One refiner is being quoted as holding four tanks which he proposes to sell at not less than 4 cents. There has been a good movement from the refiners of late and refiners seem to be shipping about all that they run. These deliveries on contracts may be sufficient with the rather light output to prevent any real accumulation of supplies, that is if the deliveries continue long enough but the present demand is light and if the weather holds out as it usually does during the first half of October a continued light demand is probable. In most seasons there is a period of light consumption and a decrease in the demand when the first fills have been made and we are having this right now. There are many contracts that call for deliveries at the market price date of shipment but the larger distributors have fixed prices either for the season or for each month and these prices are below what the refiners are asking for spot orders and it frequently happens that some of these larger distributors are at times sellers of distillate. This might be one of those occasions if their purchases come along rapidly and the demand is quiet.

Zero Gas Oils

There is about the same condition in the zero gas oils. The movement is larger as most of the burners will now operate

on a gas oil and the price to the consumer is lower. The supplies are limited and some refiners have been quietly trying to add to their stocks. There are some supplies offered from West Texas but many jobbers will not even consider any gas oil from this source for their domestic burner trade. It is unfortunate that some jobbers had very bad experiences with this gas oil and distillates from West Texas which it may take some months, if not years, of careful refining to overcome. There are some very good products being refined by these refiners and the same crude is being run in many plants away from that state so that some of these jobbers who ban all West Texas products, are unwittingly delivering to their customers the products from West Texas crude although refined at plants not in Texas. The ordinary zero gas oil is being held by refiners for 3 cents and a real zero straw gas oil of even a 30 gravity is held for substantial premiums and is very hard to buy anywhere. The refiners are now running less oil to their cracking plants and should accumulate some gas oil but it would not be zero oil but straightrun oil. The offerings of the U.G.I. gas oil for gas makers are a little more free right now but there is an active demand even yet from some refiners as well as the gas companies and the price is steadily held. Some U.C.I. gas oil was offered here at 2¾ cents which met with the requisite specifications although it had a high viscosity. Buying in the spot market is for immediate wants only in the straightrun gas oil as dealers claim that it is difficult to sell at the refinery price to the users.

Lighter Fuel Oils

The lighter fuel oils suitable for domestic oil burners are very scarce and as the demand will be large under any weather conditions, those who have this material bought are only caring for their regular trade and some orders placed earlier in the season remain unfilled. Blended fuel oils made by blending heavy residual oils with distillate are being sold by some of the larger refineries or delivered on contracts but the price for a 28-30 zero fuel oil is well above a dollar to the users and dealers have paid as high as $1.05 for this oil. This is the price named by one of the large local plants for its 28-30 blended fuel oil with a zero cold test. There is considerable inquiry from both users and dealers and all are having trouble to buy except at full prices and then the quantity is not large.

The industrial fuel oils are moving steadily to the industries which for the most part are well supplied with orders and are operating at a high rate. The prices for industrial fuel oils are very firmly maintained and continue to be advanced by refiners. For a zero cold test fue oil 18-22 gravity with high sulphur content or for an oil of the same gravity low in sulphur but having an ordinary cold test, the ruling price is 65 cents to the dealer, Group 3 shipment. The largest local source of supply is still sold up and will be out of the market over October on all grades of heavy fuel oils and another smaller plant which has been doing a large business with local dealers is shut down for the addition of refining parts. There have been more than the usual number of rejections of late and a great deal of complaint from consumers regarding the quality of fuel oil supplied. In one case several cars were received from a refinery which were excellent but later cars supposedly of the same kind of oil were rejected because of the excessive viscosity. The oils were entirely different except as to gravity. This shows the little value of gravity as a test for quality of material. Other rejections have been made on account of the excessive amount of foreign matter in the oil furnished. There has also been a great deal of trouble caused by bad odor but this chiefly in the furnace oil group.

Lube Slow

Lubricating oils are moving rather slow as is more or less usual at this time. Mid-Continent bright stocks are very firmly held at 37 cents with a number of good inquiries received, some from the East. Other refinery stocks are quiet. Motor oils are unchanged and in fair demand, nothing special about them.

Regarding the tank wagon scale in this territory, it seems to be generally admitted that the present prices will hold over this month. Many believe they will hold indefinitely unless there is a decline in the prices for Mid-Continent crude.

IMPROVEMENT SHOWN IN EASTERN MARKET

(Continued from Page 218)

ports of refined petroleum products from New York during the past three weeks (all figures in gallons unless otherwise noted):

	Week ended		
	Sept. 28	Sept. 21	Sept. 14
Gasoline	1,010,200	623,700	184,000
Naphtha	4,698,800	81,300	1,111,200
Kerosene	226,300	221,100	162,600
Fuel oil	33,400	19,000	294,000
Lub. oil	1,853,900	1,101,500	1,351,700
Petroleum, refined ...	1,861,900	296,900	1,844,000
	Pounds		
Petrolatum ..	27,000	.....	7,000
Paraffin wax	2,606,500	1,562,800	1,681,800
Refined ...	.....	.....	460,100
Scale	332,300	1,156,300	62,300
Lub. grease .	1,145,900	1,616,400	1,440,500

Included in the week's exports was a single shipment of 3,454,000 gallons of deodorized naphtha on the Rhea for Dunkirk or Rouen.

Imports

Imports of crude and refined oils at the principal United States ports for the week ended September 28 totaled 1,923,000 bbls., a daily average of 274,714 bbls., compared with 1,930,000 bbls., a daily average of 275,714 bbls. for the week ended September 21 and a daily average of 284,929 bbls. for the four weeks ended September 28. Details follow:

(Barrels of 42 gallons)

At Atlantic Coast ports—	
Baltimore	218,000
Boston	73,000
New York	957,000
Philadelphia	270,000
Others	230,000
Total	1,748,000
Daily average	249,714
At Gulf Coast ports—	
New Orleans and Baton Rouge ..	15,000
Port Arthur and Sabine district..	160,000
Total	175,000
Daily average	25,000
At all United States ports—	
Total	1,923,000
Daily average	274,714
Daily average four weeks	284,929

The Department of Commerce report on August imports shows a total of 5,800,000 bbls. imported into the United States during the month, a daily average of 187,100 bbls. Countries or origin follow:

(Barrels of 42 gallons)

Mexico	1,445,000
Venezuela	3,016,000
Colombia	914,000
Other countries	425,000

California Oil Receipts

Receipts of California crude and refined oils at Atlantic and Gulf Coast ports for the week ended September 28 totaled 392,000 bbls., a daily average of 53,000 bbls., compared with 705,000 bbls., a daily average of 100,714 bbls. for the previous week and a daily average of 64,643 bbls. for the four weeks ended September 28. Details follow:

(Barrels of 42 gallons)

Atlantic Coast ports—	
Baltimore	109,000
New York	62,000
Philadelphia	108,000
Others	113,000
Total	392,000
Daily average	56,000
Daily average four weeks	64,643

Distribution of total California oil receipts is as follows:

Gasoline	217,000
Gas oil	137,000
Kerosene distillate	38,000

There were no receipts of California oil at Gulf ports during the week.

Shipments of California products eastward during the week were as follows:

To New York—97,000 bbls. of gasoline on the Dixie Arrow; 65,000 bbls. of distillate on the Tiger; 78,000 bbls. of gasoline on the Pat Doheny.

To Baltimore—80,000 bbls. of gasoline on the J. C. White.

To Philadelphia—77,500 bbls. of gasoline on the Hadnot and 86,000 bbls. of gasoline on the Sunbeam.

To Boston—96,000 bbls. of gasoline on the Java Arrow.

OKLAHOMA FIELDS

(Continued from Page 217)

Company, farm—	Location	Wells	Prod.
Nevins	32-10-6	4	734
Papoose:			
Marks	32-10-6	1	340
Pine:			
Lula	4- 9-6	1	10
Prairie:			
Cannon	33-10-6	1	1
J. Carter	10- 9-6	1	3
Houch	33-10-6	1	3
Hurford	33-10-6	1	23
Kincaid	33-10-6	2	26
Wimer	22-10-6	1	15
Pure:			
Aldridge	3- 9-6	3	640
Shell:			
Strothers	3- 9-6	4	189
Crump	32-10-6	2	20
Sinclair:			
Polly	3- 9-6	4	1,375
Superior:			
Varnum	4- 9-6	1	20
Texas:			
Fleet	4- 9-6	1	17
Twin State:			
Varnum	4- 9-6	2	125
Wilcox:			
Chupco	4- 5-6	7	207
Total		82	10,946

Recent Patents

(Continued from Page 219)

ucts from such enlarged chamber into a second enlarged chamber, the heat supplied to the oil being such that it enters the second enlarged chamber at a temperature not below 680 to 700 degrees Fahrenheit, and supplying within the second chamber regulated quant ties of free oxygen containing gas to substantially maintain said temperature.

1,688,325. Art of Cracking Hydrocarbons John E. Bell, deceased, Brooklyn, N. Y., by Lola R. Bell, executrix, Brooklyn, N. Y., assignor to Sinclair Refining Co., New York, N. Y., a corporation of Maine. Filed January 22, 1925. Serial No. 3,985. 4 Claims. (Cl. 196—59.)

2. The improvement in the operation of externally heated pressure stills for cracking hydrocarbon oils, which comprises circulating oil from a bulk supply drum to the lower end of vertically arranged heating tube and thence upwardly through the heating tubes and back to the bulk supply drum from the upper end of the heating tubes, heating the oil to the cracking temperature in the heating tubes by passing hot products of combustion from a fire box first in contact with the upper end of the heating tubes and thence downwardly over the heating tubes, and preventing direct radiation from the fire box to all parts of the heating tubes, whereby uniform distribution of the heat absorption is promoted and the oil is brought to the maximum cracking temperature as it leaves the upper end of the heating tubes and is discharged to the bulk supply drum.

1,680,580. Method of Distilling Hydrocarbons. Frank E. Wellman, Kansas City, Kans., assignor to Kansas City Gasoline Co., Kansas City, Kans., a corporation of Kansas. Filed June 3, 1922. Serial No. 565,634. 3 claims. (Cl. 196—48.)

1. The method of treating hydrocarbon oil to produce a lighter hydrocarbon of the same series, which consists in distilling the heavier hydrocarbon in one zone at high cracking temperature and pressure, fractionating all the vapors produced in said first zone in a second zone, conducting off and condensing the vapors from said second or fractionating zone while refluxing to and redistilling the heavier fractions in a third zone at a temperature lower than that in the first cracking zone, separately fractionating in a fourth zone the vapors produced by redistillation in said third zone, conducting off and condensing the light vapors from said fourth zone, returning the heavier fractions from the fourth zone into the third zone, and returning all the heavier fractions from the third zone in liquid phase into the first zone.

Statement of the Ownership, Management, Etc., of

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JOHN M. EGAN,
General Manager.

Sworn to and subscribed before me this 5th day of October, 1929.

IRENE BOOKER,
Notary Public.

My commission expires February 26, 1933.

Classified Wants

(Continued from Page 221)

FOR SALE—MAPS

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WANTED

HAVE YOU REAL BARGAIN? "Perpetual royalty" profit possibilities. Mail particulars. Investor, P. O. Box 382, Troy, N. Y.

WANTED TO BUY shallow production with undrilled locations. Gas on lease must be suitable for casinghead gasoline plant. If gas is contracted for give date contract expires. Address Box D-151, The Oil and Gas Journal, Tulsa, Okla.

WANTED PARTIES WITH CAPITAL to carry me one-eighth interest free in best 80-acre lease, surrounded by major oil companies near Creekville, Ohio, oil pool. Lease had one Clinton sand well ruined by shot years ago, flowed 50 bbls. first 24 hours, produced thereafter by swabbing. When abandoned oil flowed over derrick height. C. H. Wise, Rd. 2, Renfrew, Pa.

CAPITAL WANTED to develop proven acreage. Will sell undivided interests in producing acreage, in hundred dollar units. Proceeds to be used solely to develop property. Real opportunity for parties with small capital to participate development program. Excellent possibilities. Room 2630, 11 West 42nd St., New York City.

LARGE WELL EQUIPPED plant with plate fabricating shop, pattern shop, foundry and machine shop wishes to secure patented specialties to manufacture. Complete information should be submitted for consideration. Address Box No. D-166, The Oil and Gas Journal, Tulsa, Okla.

WANTED DRILLER with drill rig to drill 10 wells in 26-13-12 to 550-foot sand, Okmulgee County, Oklahoma. Joins leases with 50 pumpers at this depth. Production on four sides. Must take interest. Douglas Jones, Trustee, Henryetta, Oklahoma. Phone 544.

AN OPEN LETTER

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Natural Gasoline Manufacture

PROBLEMS IN STEAM ENGINEERING— STANDARD OF BOILER EFFICIENCY

By T. F. Williams*

When making a horsepower test a more elaborate method is required than for a comparative fuel valve test, because different boilers generate steam at different pressures, different feed water temperatures and different degrees of dryness; hence, to compare the performances of boilers so as to determine their horsepower, it is necessary to reduce the actual evaporation to an equivalent evaporation from and at 212 degrees Fahrenheit per pound of combustible or per cubic feet of combustible, as the case may be. The expression "from and at 212 degrees Fahrenheit" means that a feed water temperature of 212 degrees Fahrenheit is evaporated into dry steam at that same temperature.

A committee of the American Society of Mechanical Engineers has recommended as a commercial horsepower an evaporation of 30 pounds of water per hour, a feed water temperature of 100 degrees Fahrenheit into steam at 70 pounds gauge pressure, which is that equivalent to 34.5 units of evaporation, that is, to 34.5 pounds of water evaporated from a feed water temperature of 212 degrees Fahrenheit into steam at the same temperature.

Since 965.8 B.t.u. is required to evaporate a pound of water from and at 212 degrees Fahrenheit, a boiler horsepower is equal to 965.8 × 34.5 = 33,320 B.t.u. per hour.

In order that the preceding paragraphs may be readily understood the writer will take as an illustration two boilers, one evaporating 30 pounds of water per hour from a feed water temperature of 100 degrees Fahrenheit into steam at 70 pounds gauge pressure and the other evaporating 34.5 pounds of water per hour from a feed water temperature of 212 degrees Fahrenheit into steam at zero gauge pressure or 14.7 pounds absolve. Each boiler is generating one boiler horsepower per hour. To prove this, it will be necessary to take into consideration the factor of evaporation, which is found by applying the following formula:

$$E = \frac{(H - t + 32)}{965.8}$$

in which H equals total heat of steam above 32 degrees Fahrenheit at observed pressure of evaporation and E the factor of evaporation.

t = observed feed water temperature.

The quantity $\frac{(H - t + 32)}{965.8}$ that changes the actual evaporation of 1 pound of water to equivalent evaporation from and at 212 degrees Fahrenheit is called the factor of evaporation. The equivalent evaporation is found by multiplying the actual evaporation by the factor of evaporation; therefore the equivalent of the boiler evaporating 30 pounds of water per hour at 70 pounds gauge pressure is equal to:

$$30 \times \frac{(H - t + 32)}{965.8}$$

substitute for H the value found in steam table and for t the observed feed water temperature, the formula becomes

$$30 \times \frac{(1174.3 - 100 + 32)}{965.8}$$

= 34.5 pounds of water per hour, the equivalent evaporation.

To further illustrate the equivalent evaporation of a boiler producing one horsepower per hour consider a boiler evaporating 27.8 pounds of water per hour from a feed water temperature of 32 degrees Fahrenheit steam at 250 pounds gauge pressure. The equivalent of this boiler is equal to:

$$27.8 \times \frac{(H - t + 32)}{965.8}$$

substitute for H the value found in steam table, and for t the observed feed water temperature, and the formula becomes:

$$27.8 \times \frac{(1204.2 - 32 + 32)}{965.8}$$

= 34.5 pounds of water per hour the equivalent evaporation.

These three boilers are developing one horsepower each, that is, the boiler evaporating 30 pounds of water per hour from a feed water temperature of 100 degrees Fahrenheit which is 34.5 pounds of water per hour from and at 212 degrees Fahrenheit at zero gauge pressure, which is equivalent to the boiler evaporating 27.8 pounds of water per hour from a feed water temperature of 32 degrees Fahrenheit at 250 pounds gauge pressure.

It is seen from the above illustrations that when a boiler is generating 34.5 units of evaporation it is producing one boiler horsepower, but to complete the horsepower of any boiler, as the writer has stated before, it is necessary to reduce the actual evaporation to the equivalent. Consider a boiler evaporating 1,000 pounds of water per hour from a feed water temperature of 150 degrees

(Continued on Page 240)

*Read at Foremen's Meeting, Columbian Gasoline Corp.

HEAVY BLENDED PRODUCT POPULAR WITH MOTORISTS

The use of natural gasoline blended in proper proportions with refinery gasoline to control volatility is not only practical from a manufacturing angle but it provides a motor fuel which is finding favor with motorists, according to an official report of the Phillips Petroleum Co. of Bartlesville, Okla. The Phillips company, which is the largest manufacturer of natural gasoline in United States, has been specializing in a motor fuel in which a substantial quantity of natural gasoline is used. The natural gasoline is blended with a refinery gasoline obtained from the company's refinery located at Borger, Tex. Both automobile and aviation grades are sold.

Starting with four stations in 1927, the Phillips company has rapidly expanded its marketing facilities until the company now has 500 owned or leased stations located throughout Kansas, Oklahoma, Colorado, Texas, New Mexico, Minnesota, Nebraska, Iowa and Missouri. The sales, according to O. K. King, treasurer of the company, are approaching an annual rate of 100,000,000 gallons yearly.

New stations are being completed at the rate of 50 per month and in addition the company is negotiating for the purchase of many smaller units operating within their marketing territory.

START SHAMROCK PLANT

The Shamrock Oil & Gas Co. has started operating its new gasoline plant in Gray County of the Texas Panhandle. The plant is located 12 miles north of the town of McLean in a new producing area. The plant will have an output of approximately 15,000 gallons daily.

The Warren Petroleum Co. of Tulsa, marketer of natural gasoline, has contracted for the entire output of the plant.

NATURAL GASOLINE PRODUCTION OVER 6,000,000 GALLONS DAILY

Natural gasoline production in August for the first time in the history of that industry passed the mark of 6,000,000 gallons daily. The latest Bureau of Mines report covering operations for that month shows a total production of 189,300,000 gallons or 6,110,000 gallons daily. This compares with a production of 185,500,000 gallons in July, or an average of 5,980,000 gallons daily. The July production was the previous peak in the history of the industry.

The August production was 30 per cent

(Continued on Page 240)

NATURAL GASOLINE, AUGUST, 1929 (Thousands of Gallons)

	Natural gasoline production				Stocks end of month		Blended motor fuel, August, 1929: Natural gasoline used	Blended motor fuel, August, 1929: Naphtha or other oils used	Stks end of mo.
	Aug., 1929	July, 1929	Aug., 1928	Jan.-Aug., 1929	Aug., 1929	July, 1929			
Appalachian	6,300	5,900	5,800	66,300	2,454	3,202	83	124	230
Ill., Ky., etc.	900	900	900	8,900	190	225	1	1	10
Oklahoma	57,500	57,600	48,500	447,700	17,478	20,228	1,914	1,953	564
Seminole, etc.	30,900	31,000	19,200	230,200	3,357	3,472	542	648	159
Osage County	7,000	6,600	8,000	54,900	7,860	9,564	1	1	3
Rest of State	19,600	20,000	21,300	162,600	6,261	7,192	1,371	1,304	403
Kansas	2,500	2,500	2,900	22,400	646	1,199	37	3	7
Texas	35,300	33,200	26,400	263,400	13,895	20,606	389	499	123
Panhandle	15,800	13,500	9,000	105,800	9,310	13,488	321	292	21
North Texas	3,700	3,900	3,400	32,300	673	1,228	41	37	37
West Central	12,200	12,100	12,600	100,400	3,627	5,623	98	138	60
Rest of State	3,600	3,700	1,400	24,900	285	267	31	32	15
Louisiana	5,100	4,900	4,500	39,500	633	820	13	22	10
Arkansas	2,400	2,700	2,800	21,300	269	254	228	271	11
Rocky Mountain	4,200	4,000	4,200	30,800	525	545	..	..	..
California	74,700	73,800	48,400	520,300	1,429	1,461	..	..	..
Long Beach	20,200	20,500	17,700	157,500	...	...	..	..	..
Ventura Ave.	7,000	6,700	5,500	51,000	...	...	..	..	..
Seal Beach	3,900	3,900	2,600	27,600	...	...	..	..	..
Huntington Beach	3,600	3,500	4,100	27,500	...	...	..	..	..
Santa Fe Springs	23,400	22,700	3,100	133,900	...	...	..	..	..
Rest of State	16,600	16,500	15,400	122,800	...	...	..	..	..
Total (gallons)	189,300	185,500	144,400	1,420,600	37,524	48,543	2,664	2,873	955
Daily average	6,110	5,980	4,660	5,850	...	...	..	..	..
Total (bbls.)	4,507	4,417	3,438	33,824	893	1,156	63	68	23
Daily average	145	142	111	139	...	...	..	..	..

OUTPUT OF MOTOR FUEL (Thousands of gallons)

	August, 1929	July, 1929	August, 1928	Jan.-Aug., 1929
Gasoline produced at refineries*†	1,617,400	1,589,900	1,425,400	11,883,600
Natural gasoline blended at plants east of California	2,700	2,900	1,900	19,500
Natural gasoline sold direct to jobbers	2,100	2,100	2,100	16,800
Benzol production‡	11,100	11,100	9,800	86,300
Total motor fuel produced	1,633,300	1,606,000	1,439,200	12,006,200
Daily average	52,690	51,810	46,430	49,410
*Includes natural gasoline blended at refineries	159,600	150,100	118,000	1,143,400
†Includes natural gasoline run through refinery pipe lines in California	17,900	9,700	6,200	63,000

‡Estimated with production of by-product coke as a basis.

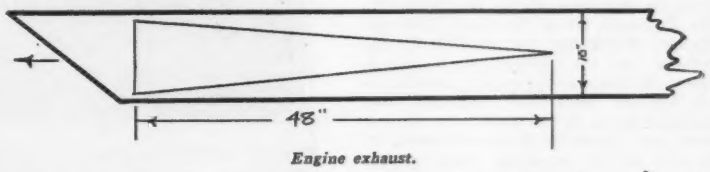
A PRACTICAL SUGGESTION

ENGINE EXHAUSTS

There are very few plants having the same type or design engine exhausts. being made of reinforced concrete, stove chimney affairs and pipes. The pipe or casing exhausts may be horizontal, vertical or even set at an angle. They may discharge directly into atmosphere or into a pipe of larger diameter. Some are perforated near the end.

The purpose of an exhaust is to carry away the burnt gases of combustion and also the varying quantities of water that is run into the exhausts near the valves; they are also required to muffle the noise of the explosion of the engine cylinder. In designing, attention must be given to obtaining the smallest back pressure possible, also to conducting the water away so that it is prevented from drenching and disfiguring the buildings, as well as the rotting of roofs. The gases of combustion sometimes contain nitric and nitrous oxides, and any sulphur present in fuel gas is burned to sulphur oxide, all of which are highly corrosive and quickly destroy the galvanized sheet iron on the buildings.

The exhaust shown here is especially applicable in plants having only a few engines. It consists in discharging each engine into casing. For an 80 to 90 horsepowered engine this may be 8-inch or 10-inch casing. Near the end of the exhaust a triangular section is cut out on each side of the casing. for the 10-inch this triangle has about a 10-inch base and approximately 48-inch altitude. The end of exhaust is cut off at about a 30-degree angle.



Engine exhaust.

Practical suggestions by those connected with the construction and operation of natural gasoline plants are invited. Payment will be made as soon as suggestions are accepted. Address all communications to the Natural Gasoline Department, The Oil and Gas Journal, Tulsa.

Brief Items for Petroleum Refiners

Annual Convention Of Texas Marketers Held in San Antonio

SAN ANTONIO, Tex., Oct. 7.—Texas Petroleum Marketers Association held its first annual convention in San Antonio, the last three days of last week. It enlarged its program and doubled its budget increasing it to $40,000 for the year's work. It increased its vice presidents to four to take care of the additional work and relieve the president and also increased its board of directors by adding 12 more members.

The new Texas Petroleum Marketers Association grew out of the Texas Independent Oil Men's Association and while it was organized in October, 1928, all the real work of the new association has been done since March of 1929.

The convention the first day listened to the address of Gen. H. C. Smither, delivered in Tulsa, and transmitted to San Antonio by radio. President J. B. Russ of Houston said the Texas Petroleum Marketers Association has launched the first constructive movement in Texas with a definite program for bringing about a stabilization in the marketing branch. William J. Mackenzie, of the aeronautical branch of the department of commerce, spoke on the future of commercial aviation; G. French of the Sinclair Oil Co., on station sales and service; Frank J. Lovejoy of the Vacuum Oil Co., on "From Rattlesnake Oil to Petroleum;" Ralph R. Matthews, of Kansas City, vice president of Battenfeld Grease & Oil Co., on "Grease Merchandising for Jobbers," R. F. Spencer, of the City Central Bank of San Antonio, on the bankers' view of the petroleum marketing business; R. S. Sterling of the Texas Highway Commission, on the Texas road building program; Hal Noble, of The Texas Company, on the Code of Ethics; and Rice M. Tilley, assistant attorney general of Texas, on the state's gasoline tax law.

Officers elected for the ensuing year are: President, J. B. Russ of Houston; vice president, C. M. Dillon of Amarillo; Grover C. Shaw of San Antonio, George Bowers of Dallas, J. S. McNutt of El Paso; treasurer, W. C. Gaylor, Houston; secretary, C. A. Slimp of San Antonio; directors: Dick Anderson of El Paso,

(Continued on Page 235)

INTERSTATE COMMISSION INTO MONTANA RATES

WASHINGTON, D. C., Oct. 5.—The Interstate Commerce Commission is commanded to investigate and determine whether petroleum and petroleum products rates prescribed by the Montana Railroad Commission for intrastate application on the lines of the Northern Pacific Railway, Great Northern Railway, Chicago, Milwaukee, St. Paul & Pacific Railway, and the Chicago, Burlington & Quincy Railway cause unjust discrimination against interstate commerce, this command being in the form of a writ of mandamus issued by Justice Wendell P. Stafford of the Supreme Court of the District of Columbia.

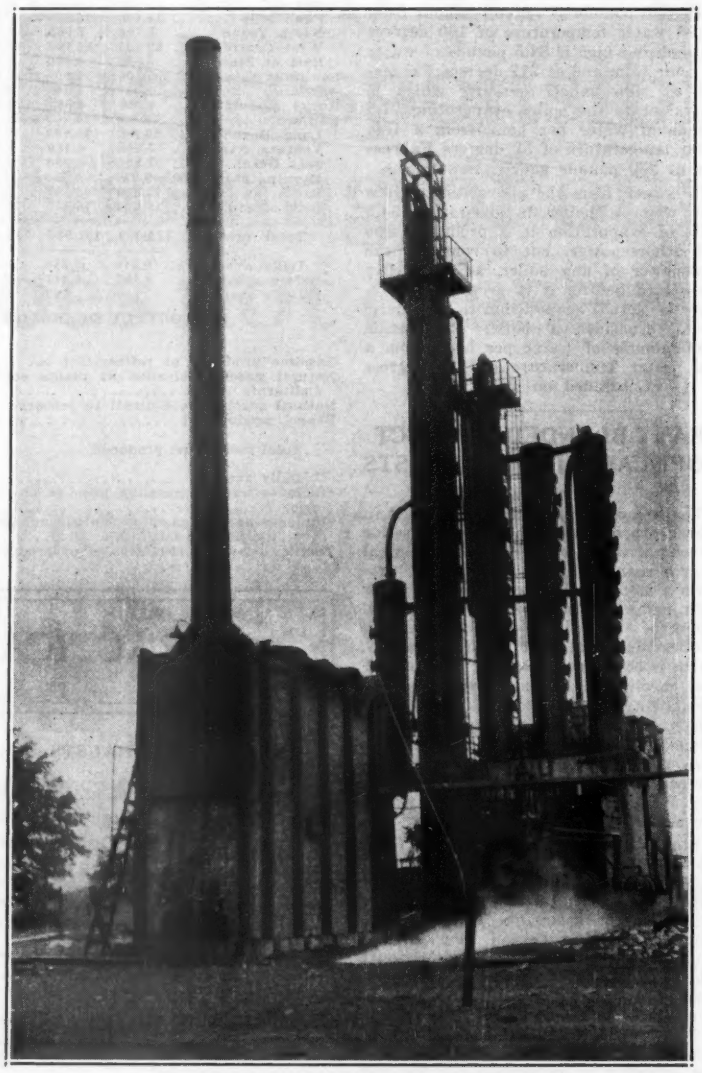
In this case the board of railroad commissioners of Montana issued an order effective April 17, 1929, requiring the petitioning railways to make substantial reductions in their rates for transporting petroleum and petroleum products intrastate in Montana. The case will be argued before the United States Supreme Court in the October term. The order of the Montana railway commissioners has been the cause of considerable legal procedure and is regarded as of great importance of the railways affected.

ESTABLISH RECORD IN BUILDING OLD DUTCH REFINERY AT MUSKEGON

The Old Dutch Refining Co., which recently started operating a new refinery at Muskegon, Mich., probably has established a new record in time required for plant construction.

Less than nine weeks expired from the time the first construction started at the refinery until the plant was in complete operation. The decision to build the plant followed the discovery of substantial crude oil production in the Muskegon area. It was necessary to build the plant in the shortest time possible and all phases of the construction were rushed to completion.

New equipment was used exclusively.



View of distilling and fractionating equipment at Muskegon, Mich., refinery of the Old Dutch Refining Co.

The distilling and fractionating equipment, which is shown in the accompanying photograph, is an excellent example of the compactness now obtainable in crude oil units without sacrifice in efficiency. The unit shown has a capacity of 3,000 bbls. daily and at present is taking approximately 60 per cent of the crude charge overhead in several finished cuts. The unit was designed and installed by the Southwestern Engineering Corp.

The operation of the installation is largely automatic from the control of the crude charge to the recovery of finished streams from the towers. The operation is flexible so that a variety of products are obtainable from the streams if desired.

In addition to the distilling and fractionating unit, the plant includes a new power plant, pump house, treating plant and loading rack. Approximately 150,000 bbls. of storage has been erected to care for the storage of crude oil and finished products.

Walter E. Anderson is the president and the active executive head of the Old Dutch Refining Co., which was organized to build the Muskegon refinery. Mr. Anderson is well known in marketing circles. He was the head of the Winona Oil Co. of Winona, Minn., a large jobbing concern, until last year when the properties were sold to the City Service Oil Co.

Walter Schuttler of Chicago is chairman of the board. Ernest L. Hughes of Chicago is vice president of the company. John Borden of Chicago is secretary and treasurer. E. W. Guy, for several years superintendent of the Orient Refining Co.'s plant at Wichita Falls, Tex., is superintendent of the refinery.

CARAVAN WILL OPERATE OKLAHOMA CITY PLANT

The Caravan Oil & Refining Co. has taken over the old Turley refinery at Oklahoma City and expects to start operating the plant before the end of the month. The plant which was last operated under the name of the Home Refining Co. has been shut down for several years.

The new owners are reconditioning the plant and expect to have a crude oil capacity of 5,000 bbls. daily. The crude oil will be obtained by pipe line from the Oklahoma City Field. The Caravan company is a newly organized concern. J. B. Van Hooser is president of the company. Offices are located in the Perrine Building, Oklahoma City.

The Electrol Refining Co. is also said to be making preparations to start operating the old Atwood refinery at Oklahoma City. This plant has been shut down for some time. The Electrol company operates a special process known as the McCabe process.

EXTEND VACATION PLAN

CHICAGO, Oct. 8.—The Standard Oil Co. of Indiana has extended its vacation with pay plan to include approximately 5,000 additional employes belonging to the hourly wage class, according to an announcement today by E. G. Seubert, president of the company. The announcement was made in connection with the annual meeting of the Industrial Relations Group which met here today.

The extension of the vacation plan will include stillmen and mechanics. They will be entitled to one week's vacation on pay after five years of service and two weeks after 10 years' service.

TRIMBLES RESIGN FROM SHELL

CHICAGO, Oct. 5.—W. H. and R. B. Trimble, former managers of the Western Oil Refining Co., of Indianapolis, which sold out to the Shell Petroleum Corp., recently have announced their resignation from that organization. It was stated at the time of the closing of the purchase that they would continue with the Shell organization at Indianapolis. It is understood that they will devote their time to the management of their real estate interests which are very large and which were not included in the sale of their oil business. These realty holdings are in the name of the Trimble Realty Trust.

ENJOIN TAX PAYMENT

CHICAGO, Oct. 8.—The Yellow Cab Co. and the Benzolene Motor Fuel Co. have secured a temporary injunction restraining the State from collecting the state gasoline tax which recently became effective.

The companies contend that they should be exempt from the payment of the tax which is to be devoted to the building of state highways. They contend that they operate their cars only on city streets.

JOBBERS MEET OCTOBER 24

MINNEAPOLIS, Minn., Oct. 5.—The Northwestern Petroleum Association will hold a general meeting at the Hotel Radisson, Minneapolis, on October 24, at which the Code of Ethics and other matters will be discussed.

BUYS FRANKLIN PLANT

The properties of the Quality Oil Co. at Franklin, Pa., have been sold at a receiver's sale to the Guaranty Trust Co. of Butler, Pa. The properties include a small refinery and marketing equipment.

EXPOSITION CROWDS GREATER THAN EVER

(Continued from Page 53)

the derricks that stand on this ground. You will observe that all but one are of steel structure. At the first exposition held six years ago they were all of wood, but one.

"Each year the oil industry is showing more efficiency, more economy, better understanding, which leads to co-operation in every branch, in all of which the International Petroleum Exposition has been of effective assistance."

Congressman's Advice

Congressman O'Connor spoke briefly saying that while, as a member of congress, he was in sympathy with organized industry he hoped that the oil industry could settle its problems without the necessity of asking governmental supervision.

Mayor Dan W. Patton, who in private life is a well-known engineer and quite familiar with the oil business and especially the part engineering science is taking in its progress, delivered the address of welcome to the visiting oil men and governmental representatives in which he reviewed the scientific progress of the oil business in recent years. The address of welcome was responded to by Dr. Luis Calvani, minister of industry for Venezuela, who spoke highly of the American oil men operating in Venezuela and expressed his appreciation for the hospitality toward the foreign visitors which they had experienced in their brief stay in Tulsa.

A. P. I. and the Exposition

Edwin B Reeser, president of the American Petroleum Institute, in the course of his brief address, said:

"A very significant factor in the 1929 exposition is that the American Petroleum Institute has joined hands with the directors of the exposition in making the show a success. It is of the greatest importance to the oil industry that the two large organizations are working side by side and I call attention to the fact that the annual meeting of the board of directors of the Institute is being held in this city in order to give the members of the board an opportunity of witnessing this great exhibit."

"Oil executives and the man in the field cannot place a monetary value on the lessons to be learned from a close study of the exhibits," Mr. Reeser continued. "I can only suggest that you people gathered here visit each exhibit and examine each machine on the grounds in the interest of greater co-operation and greater efficiency in the production world."

Mr. Reeser closed with a tribute to the men who had since the first exposition given so much valuable time in successfully building it up and broadening the scope of its usefulness to the oil industry.

Senorita Parades of Mexico was introduced by Chairman Veasey and the fair visitor loosened the line which held the folded national colors high in the air. As Senorita Parades let go the line the enormous American flag, said to be one of the largest ever made, floated down and over the crowd while the band played the national anthem and the crowd stood at attention and saluted with bared heads. At the same time bombs exploded in the air set free large American flags which sailed away in the breeze.

Reaching the Public

Chairman James A. Veasey officiated as master of ceremonies in his usual capable manner. His introductory remarks preceding the various scheduled talks were in his best vein. Mr. Veasey took occasion to call attention to some of the problems which confront the industry. As he was speaking not only to the audience facing him but to those "listening in" from one end of the country to the other, all of whose every-day lives were either directly or indirectly influenced more or less by the oil business, Mr. Veasey talked of overproduction, of the effort of oil men to conserve oil in the ground, of the difficulties of keeping production level with consumption by the very nature of the product, and the necessity of a better public understanding of the oil industry which had been so largely responsible for the present-day prosperity of this country, and its high scale of living.

Attendance Doubled

When it is said that twice as many people passed through the gates on the opening day of the sixth annual International Petroleum Exposition and Congress as were recorded on the first day of last year's exposition, and that the attendance on the second and third days this year was even more than twice that of the same days last year the story of the growth of interest in the great industrial show is told in a most significant way.

With a continuation of the perfect weather that greeted the show on the opening day it is safe to say that last year's attendance will be more than doubled throughout this week.

The sixth annual exposition is by far the best show of oil industrial goods yet exhibited. There are more exhibitors and more exhibits than in the past years and the exposition is being held on greatly enlarged grounds, vastly improved over last year. Additional buildings, broad paved streets, and improved lighting are some of the features of the 1929 show.

The exhibits include everything used in the oil business from lease forms right down the line through rigs, drilling, producing, storing, transporting, refining, marketing and retailing. All that science has done for the oil business is on exhibition in latest form, all the ingenuity of the practical man in the field and the engineer, and scientist is there in one form or another. Those who have seen every show from the first to the present marvel at the 1929 exposition, which even at this early date promises to be larger next year judging from the demand for space in the 1930 show.

There are oil men present from every oil-producing state in the union and a large number of foreign oil men. Determined to miss nothing that the exposition presents a number of foreign delegates to the congress and representatives of foreign oil companies arrived early and will remain throughout the show. Registering from Mexico were Senors Trinidad Parades, Vincente Fuentes, H. Bottinger, John S. Korsookeen and Senorita E. Parades; from Russia, F. B. Rustamberkoff, M. Shahnazakov, L. L. Tiferis, M. A. Kaplushnikoff, M. A. Gauman, F. P. Tchamroff, L. G. Arutunoff, Mr. Berezovsky, S. C. Khanbekoff, V. Hatchatousoff; from Rumania, R. Kost, Nic. Stefanescu, Andrie Dragulanescu, V. DeMetz, J. De Montlebert; from Argentine, Mr. and Mrs. Vanderstein; from Germany, Cunther Schlicht; from Venezuela, Dr. Luis Calvani; from Italy, Romolo Angelone. The above named are only a part of the foreign visitors, many of whom had not registered when this was written.

Institutional Gatherings

The American Petroleum Institute gave unqualified recognition to the exposition by holding its annual directors' meeting, and sessions of the Division of Development and Petroleum Engineering. The American Institute of Mining and Metallurgical Engineers, petroleum division, held a two day session. The refiners division of the National Association of Credit Men and the safety division of the Mid-Continent Oil and Gas Association met for one day. The American Association of State Geologists met on Tuesday and on the same day the National Petroleum Conservation Service held a session. The Mid-Continent Oil and Gas Association will hold its annual banquet Thursday evening following its annual meeting. The Mid-Continent Royalty Owners' Association will hold its annual meeting Thursday. A Rotary International dinner will be accorded to foreign delegates and oil marketers will formally discuss the American Petroleum Institute code of ethics. Boy Scouts are taking part in the exposition and will hold a safety contest on Saturday on the grounds. Each day of the show musical programs are given and motion pictures showing the oil industry in its various phases will be an every-evening feature. In the sports section the annual oil men's golf tournament is being held on the Country Club course.

The close association of the oil industry and aviation was recognized by the International Petroleum Exposition and Congress which this year staged a great aviation meeting including races for money and valuable trophies as a part of the oil show. On Saturday the On-To-Tulsa derby was held in which William Parker of Bartlesville, Okla., in his Travelair ship won over 10 other ships flying from different points to Tulsa. Parker started from a field 21 miles north of Crooks, Neb., 500 miles from Tulsa and averaged 154.72 miles an hour during the flight. James Haizlip of Tulsa, who flew a Tester, a special Lockhead plane, was second and Errett Williams, flying an Eaglerock, was given third place. Haizlip flew from Colorado Springs, Colo., and made the 512 miles at an average speed of 173.13 miles per hour. While Haizlip's speed was greater than that attained by Parker, size and type of plane were considered, which gave Parker first place. Haizlip also started from Colorado Springs and his average time was 133.2 miles per hour, which was fast enough to win him third money. The first prize was $2,000; second $1,500, and third $1,000.

R. Drake flew the longest distance of any of the contestants. He used a Travelair and flew from Bradford, Pa., to Tulsa, a distance of 1,002 miles at an average speed of 124.58 miles per hour. He lost time refueling.

The Gold Shell, a 14-passenger Fokker F-10 was the largest ship in the race. It flew from New Orleans, La., and averaged 108.18 miles.

Parker flew his own ship; Haizlip flew Erle Halliburton's plane; The Texas Company sponsored the plane piloted by Williams, and the Kendall Refining Co. the plane that made the Bradford to Tulsa flight, while the Shell Petroleum Corp. owns the big ship that came from New Orleans.

On Monday afternoon the air was full of airplanes, which flew over the exposition grounds and over the city of Tulsa in various formations and singly and in the course of the mass flight some of the pilots put on some thrilling stunts.

AUTOMATIC PUMPING STATION

One of the most interesting exhibits at the Petroleum Exposition is the automatic pipe line pumping station in operation on the grounds. The exhibit is in charge of William G. Heitzel of the Sinclair Pipe Line Co.

EAST CENTRAL TEXAS

CORSICANA, Tex., Oct. 7—The situation in the East Central Texas remains about the same. There is little of great interest except the routine drilling.

The Humble Oil & Refining Co. at Boggy Creek is drilling three tests and rigging up on three locations. Its No. 2 J. C. Beard is drilling 3,692 feet; No. 2 Annie Purvey is in shale and lime at 2,900 feet, and No. 4 Lizzie Smith is in chalk at 2,925 feet. Southern Pine Co.'s No. 4-A was abandoned in chalk at 3,730 feet.

Two small producers have been developed in Hill County. Harper and Latson's No. 1 J. T. Jones is pumping 20 bbls. from a depth of 700 feet, while Harper and Starkey's No. 1 Jones is pumping 5 bbls. from a depth of 810 feet.

EAST CENTRAL TEXAS

Boggy Creek	2,110
Cedar Creek	85
Currie	415
Hill County	18
Mexia	5,210
Minerva	615
Nigger Creek	310
Powell	7,420
Richland	315
Thrall	25
Wortham	940
Total	17,463
Week ending September 28	18,191
Decrease	728

BENSON BECOMES TREASURER

At a meeting of the board of directors of the American Meter Co., F. W. Benson of Philadelphia was appointed treasurer and elected to membership on the board. Mr. Benson for many years has been assistant treasurer, and fills the vacancy caused by the death on June 30 of William E. Helme, who was treasurer and vice president of the company. The treasurer's office is in Philadelphia, Pa.

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement unless otherwise noted.

GASOLINE AND NAPHTHA

OKLAHOMA (Group 3)—	Oct. 8		Oct. 1		Sept. 24	
50-52 450 endpoint	.07	.07½	.07	.07½	.06⅞	.07¼
56-58 450 endpoint	.06¾	.07¼	.06⅞	.07¼	.06⅞	.07¼
*58-60 437 endpoint (U. S. Motor)	.0773		.0771		.0775	
*60-62 437 endpoint	.08		.0787		.08	
*60-62 400 endpoint	.08		.08		.08	
*64-66 375 endpoint	.0831		.0843		†.08	.08¼
68-70 360 endpoint	.07¾	.08¼	.08	.08¼	.08	.08¼
64-66 437 endpoint (blend)	.07¼		.07¼		.07¼	

*Weighted average prices October 7, September 30 and 23, as reported by representative refiners. Sales to jobbers only. †No sales reported to jobbers. Price shows general market.

NORTH TEXAS—						
56-58 450 endpoint	.06¾	.07¼	.06¾	.07¼	.06¾	.07
58-60 460 endpoint	.06⅝	.06¾	.06¾		.06¾	
58-60 437 endpoint (U. S. Motor)	.06¾	.07¼	.07	.07¼	.07	.07¼
60-62 400 endpoint	.07	.07¼	.07⅛	.07¼	.07¼	
64-66 390 endpoint	.07¼	.07½	.07¼	.07½	.07⅜	.07½
64-66 375 endpoint	.07½	.07¾	.07½	.07¾	.07⅜	.07¾
68-70 360 endpoint	.08	.08¼	.08	.08¼	.08	.08¼
64-66 437 endpoint (blend)	.07¼	.07½	.07¼	.07½	.07¼	.07½
*NORTH LOUISIANA—						
58-60 437 endpoint (U. S. Motor)	.07½	.07¾	.07½	.07¾	.07¾	
*ARKANSAS—						
58-60 437 endpoint (U. S. Motor)	.07½	.07¾	.07½	.07¾	.07¾	.08
PENNSYLVANIA—						
52-54 Naphtha	.07¾	.08	.08	.08¼	.08½	.09½
54-56 Naphtha	.07¾	.08	.08¼	.08½	.08½	.08¾
58-60 Gasoline	.08½	.09	.08½	.08⅝	.08¾	.09
60 Gasoline	.08⅜	.09	.08½	.08¾	.09	.09¼
62 Gasoline	.08⅞	.09	.08¾	.09	.09¼	.09½
64 Gasoline	.09¼	.09½	.09¼	.09½	.09¾	.10
68-70 350 endpoint gasoline	.10¼	.10½	.10¼	.10½	.10½	.11
CALIFORNIA—						
58-60 437 endpoint (U. S. Motor) domestic	.09	.10	.09	.10	.09	.10
CHICAGO DISTRICT (Based on Group 3)—						
50-52 450 endpoint (Naphtha)	.07¼		.07	.07½	.07	.07¼
56-58 450 endpoint	.07	.07¼	.07	.07¼	.07	.07¼
58-60 437 endpoint (U. S. Motor)	.07	.07¾	.07⅛	.07¾	.07⅛	.07¾
60-62 400 endpoint	.07½	.07¾	.07½	.07¾	.07½	.07¾
64-66 375 endpoint	.07¾	.08⅛	.07⅞	.08⅛	.07¾	.08
68-70 360 endpoint	.08⅛	.08¼	.08	.08¼	.08	.08¼
64-66 437 endpoint (blend)	.07¼	.07⅜	.07¼	.07½	.07¼	.07½
GULF COAST (Export)—						
58-60 (U. S. Motor)	.08½		.08½		.08½	
60-62 400 endpoint	.09½		.09½		.09½	
61-63 390 endpoint	.09¾		.09¾		.09¾	
64-66 375 endpoint	.10		.10		.10	

*Louisiana, Arkansas, Mississippi and East Texas delivery.

NATURAL GASOLINE

OKLAHOMA (Group 3)—	Oct. 8		Oct. 1		Sept. 24	
Grade A, 72-79.9, 375 e.p., rec. 90%	.06½	.06⅝	.06½	.06⅝	.06¾	.07
Grade AA, 80-87.9, 375 e.p., rec. 90%	.06½	.06⅝	.06½	.06⅝	.06¾	.07
Grade B, 76-83.9, 375 e.p., rec. 85%	.06⅜		.06½		.06¾	
Grade BB, 84-92, 375 e.p., rec. 85%	.06⅜		.06½		.06¾	
Grade C, 80-90, 375 e.p., rec. 78%	.06⅜		.06½		.06¾	
NORTH TEXAS—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.06½	.06⅝	.06½	.06⅝	.06¾	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.06½	.06⅝	.06½	.06⅝	.06¾	
Grade B, 76-83.9, 375 e.p., rec. 85%	.06⅜		.06½		.06⅝	.06¾
Grade BB, 84-92, 375 e.p., rec. 85%	.06⅜		.06½		.06⅝	
Grade C, 80-90, 375 e.p., rec. 78%	.06⅜		.06½		.06⅝	
NORTH LOUISIANA—						
Grade AA, 80-87, 375 e.p., rec. 90%	.06¾	.07	.06¾	.07	.06⅞	.07⅛
Grade BB, 84-92, 375 e.p., rec. 85%	.06¾		.06¾		.06⅞	.07
Grade C, 80-90, 375 e.p., rec. 78%	.06¾		.06¾		.06⅞	.07
CALIFORNIA—						
75-78 375-390 endpoint	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
CHICAGO DISTRICT (Based on Group 3)—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.06½	.06⅝	.06⅝		.06¾	.06⅞
Grade AA, 80-87.9, 375 e.p., rec. 90%	.06½	.06⅝	.06⅝		.06¾	
Grade B, 76-83.9, 375 e.p., rec. 85%	.06⅜	.06½	.06½		.06¾	
Grade BB, 84-92, 375 e.p., rec. 85%	.06⅜	.06½	.06½		.06⅝	
Grade C, 80-90, 375 e.p., rec. 78%	.06⅜	.06½	.06½		.06⅞	

BURNING OIL

OKLAHOMA (Group 3)—	Oct. 8		Oct. 1		Sept. 24	
41-43 water white kerosene	.04¾	.05½	.04¾	.05½	.05	.05½
42-44 water white kerosene	.05¼	.05¾	.05¼	.05½	.05¼	.05¾
*NORTH LOUISIANA—						
41-43 water white kerosene	.05½	.05⅝	.05½	.05¾	.05¾	
NORTH TEXAS—						
41-43 water white kerosene	.04½	.04¾	.04½	.04¾	.04¾	.05
40-42 water white kerosene	.04⅝	.04⅝	.04⅝	.04⅝	.04⅝	.04⅞
*ARKANSAS—						
41-43 water white kerosene	.05½	.05¾	.05½	.05¾	.05¾	
PENNSYLVANIA—						
43 Kerosene prime white	.06¼	.06⅜	.05½	.05¾	.06	.06¼
45 Kerosene water white	.06¼	.06½	.05¾	.06	.06¼	.06½
46 Kerosene water white	.06½	.06¾	.06	.06¼	.06½	.06¾
47 Kerosene water white	.06¾	.07	.06¼	.06¾	.06¾	.07
300 Mineral Seal	.06¾	.07	.06½	.07	.06½	.07
CALIFORNIA—						
38-40 water white Kero. (high-burning test)	.05	.05½	.05	.05½	.05	.05½
Engine distillate, 43-44, 445 endpoint	.08	.08¾	.08	.08¾	.08	.08¾
Engine distillate, 42-44, 480 endpoint	.07½	.08¼	.07½	.08¼	.07½	.08¼
CHICAGO DISTRICT (Based on Group 3)—						
41-43 water white kerosene	.04⅞	.05¼	.04⅞	.05¼	.05¼	.05⅝
42-44 water white kerosene	.05¼	.05½	.05⅝	.05¾	.05¾	.06
GULF COAST (Export)—						
41-43 prime white	.07		.07		.07	
41-43 water white	.08		.08		.08	

*Louisiana, Arkansas, Mississippi and East Texas delivery.

FUEL OIL

OKLAHOMA (Group 3)—	Oct. 8		Oct. 1		Sept. 24	
Below 18 Fuel Oil, per bbl.	.55	.60	.52½	.57½	.52½	.57½
18-22 Fuel Oil, per bbl.	.60	.65	.60	.65	.60	.65
20-22 Fuel Oil, per bbl.	.62½	.65	.62½	.65	.62½	.65
22-26 Fuel Oil, per bbl.	.75	.80	.75	.80	.75	.80
24-26 Fuel Oil, per bbl.	.80	.85	.80	.82½	.80	.82½
26-30 Fuel Oil, per bbl.	.95	1.00	.90	.95	.85	.90
28-30 Fuel Oil, per bbl. (industrial)	1.05	1.10	.95	1.10	.90	1.05
32-36 Gas Oil (industrial)	.02¾	.03	.02¾	.02⅞	.02¾	
32-36 Gas Oil (straw color)	.03	.03¼	.02⅞	.03½	.02¾	.03
36-38 Distillate	.03¾	.04	.03¾	.03⅞	.03⅝	.03¾
38-40 Straw Distillate	.03⅞	.04⅛	.03⅞	.04	.03¾	.04
NORTH TEXAS—						
Below 20 Fuel Oil	.60	.65	.60	.65	.62½	.67½
24-26 Fuel Oil, per bbl.	.70	.75	.70	.75	.70	.75
32-36 Gas Oil (straw)	.02¾	.03	.02⅝	.02¾	.02⅝	.02¾
38-40 Straw Distillate	.03¾	.04	.03⅝	.03⅞	.03½	.03¾
*NORTH LOUISIANA—						
18-20 Fuel Oil, per bbl.	.80	.85	.75	.80	.75	.80
30-32 Gas Oil	.03¼	.03½	.03¼	.03½	.03	.03¼
*ARKANSAS—						
33-36 Distillate	.03½	.03¾	.03½	.03¾	.03	.03¼
30-32 Gas Oil	.03	.03¼	.03	.03¼	.02¾	.03
16-22 Refinery Fuel Oil, per bbl.	.70	.75	.70	.75	.70	.75
GULF COAST (South Texas)—						
Gas Oil	.04	.04¼	.04	.04¼	.04	.04¼
Bunker C Fuel (cargo lots), per bbl.	.75		.75	.80	.75	.80
Bunker C Fuel (small lots)	1.00	1.05	1.00	1.05	1.00	1.05
PENNSYLVANIA—						
30-34 Fuel Oil	.04¼	.04½	.04	.04¼	.04	.04¼
36-40 Fuel Oil	.04½	.04⅝	.04¼	.04½	.04¼	.04½
CALIFORNIA—						
33-36 Distillate	.03½	.04	.03½	.04	.03½	.04
26-32 Distillate	.02½	.03	.02½	.03	.02½	.03
15-20 Fuel Oil, Bunker (at tide water)	.65	.85	.65	.85	.65	.85
15-20 Fuel Oil (cargo lots), per bbl.	.70	.85	.70	.85	.70	.85
27 plus Diesel, per bbl.	.90	1.05	.90	1.05	.90	1.05
CHICAGO DISTRICT (Based on Group 3)—						
22-26 Fuel Oil, per bbl.	.77½	.82½	.70	.77½	.70	.75
18-22 Fuel Oil, per bbl.	.65	.70	.65	.70	.60	.65
28-30 Fuel Oil	1.10	1.15	1.05	1.15	1.05	1.10
32-36 Gas Oil (zero)	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
32-36 Gas Oil (industrial)	.02¾	.03	.02¾	.03	.02⅝	.02¾
36-38 Distillate	.03¾	.04	.03¾	.03¾	.03⅝	.03¾
38-40 Straw Distillate	.03⅞	.04⅛	.03⅞	.04⅛	.03¾	.04

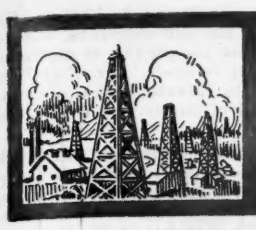
*Louisiana, Arkansas, Mississippi and East Texas delivery.

LUBRICATING OIL AND WAX

OKLAHOMA (Group 3)—	Oct. 8		Oct. 1		Sept. 24	
100 vis., 2 color, 20-25 cold test	.06¾	.07	.06¾	.07	.06¾	.07
100 vis., 3 color, 20-25 cold test	.05¾	.06	.05¾	.06	.05¾	.06
150 vis., 3 color, 20-25 cold test	.07¾	.08	.07¾	.08	.07¾	.08
150 vis., 4 color, 20-25 cold test	.07½	.07¾	.07½	.07¾	.07¼	.07½
180 vis., 3 color, 23-28 cold test	.09¼	.09½	.09¼	.09½	.09¼	.09½
180 vis., 5 color, 23-28 cold test	.08½	.08¾	.08½	.08¾	.08½	.08¾
200 vis., 3 color, 23-28 cold test	.09¾	.10	.09¾	.10	.09¾	.10
200 vis., 4 color, 23-28 cold test	.09¼	.09½	.09¼	.09½	.09¼	.09½
200 vis., 5 color, 23-28 cold test	.08¾	.09	.08¾	.09	.08¾	.09
240 vis., 3 color, 25-30 cold test	.13¼	.13½	.13¼	.13½	.13¼	.13½
240 vis., 4 color, 25-30 cold test	.12¼	.12½	.12¼	.12½	.12¼	.12½
240 vis., 5 color, 25-30 cold test	.11¾	.12	.11¾	.12	.11¾	.12
280 vis., 3 color, 25-30 cold test	.15¾	.16	.15¾	.16	.15¾	.16
280 vis., 4 color, 25-30 cold test	.14¾	.15	.14¾	.15	.14¾	.15
280 vis., 5 color, 25-30 cold test	.13¾	.14	.13¾	.14	.13¾	.14
Cylinder Stocks:						
600, steam refined, light green	10½	.12	.11	.12	.11	.12
600, steam refined, dark green	.09½	.11	.09½	.11	.09½	.11
190-200 vis., D color Bright Stock	.41	.42	.41	.42	.40	.41
150-160 vis., D color Bright Stock	.37		.37		.37	
150-160 vis., E color Bright Stock	.33	.35	.33	.35	.33	.34
Waxes:						
124-126 White Crude Scale Wax	.027⅞	.03	.023¾	.03	.023¾	.03
PENNSYLVANIA—						
34 Neutral	.07½	.07¾	.07½	.07¾	.07½	.07¾
34 Sundebloom	.07½	.07¾	.07½	.07¾	.07½	.07¾
36 Miners' Neutral	.07¼	.07½	.07¼	.07½	.07¼	.07½
150, 3 color	.16½	.17	.16½	.17	.16½	.17
180, 3 color	.21½	.22	.21½	.22	.21½	.22
200, 3 color	.24½	.25	.25½	.26	.25½	.26
220, 3 color	.28½	.29	.28½	.29	.28½	.29
600, steam refined	.25½	.26	.23	.23½	.23	.23¼
635, steam refined	.28	.28½	.26	.28½	.26	.28½
650, steam refined	.29½	.30	.28½	.29	.28½	.29
600, Pennsylvania Flash	.31½	.32	.30½	.31	.30½	.31
630, Pennsylvania Flash	.36	.36½	.35	.37½	.35	.37½
600, E filtered	.33	.33½	.32½	.33½	.32½	.33½
600, D filtered	.36½	.37	.36	.37	.36	.37
Pennsylvania Bright Stock	.52	.52½	.52	.53	.51	.52
*122-124 White Crude Scale Wax	.03	.03¼	.02¾	.03	.02¾	.03
*124-126 White Crude Scale Wax	.03⅛	.03⅜	.03	.03⅛	.03	.03⅛

*At New York.

GULF COAST (South Texas)—						
No. 2 color, 100 vis., pale oil	.05¾	.06½	.05¾	.06½	.05¾	.06½
No. 3 color, 200 vis., pale oil	.09	.09½	.09	.09½	.09	.09½
No. 3 color, 300 vis., pale oil	.09¾	.10¼	.09¾	.10¼	.09¾	.10¼
No. 3½ color, 500 vis., pale oil	.11½	.12	.11½	.12	.11½	.12
No. 4 color, 750 vis., pale oil	.12½	.13	.12½	.13	.12½	.13
No. 5 to 6 color, 200 vis., red oil	.08	.08½	.08	.08½	.08	.08½
No. 5 to 6 color, 300 vis., red oil	.08¾	.09¼	.08¾	.09¼	.08¾	.09¼



REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement unless otherwise noted.

No. 5 to 6 color, 500 vis., red oil	.09½	.10	.09½	.10	.09½	.10
No. 5 to 6 color, 750 vis., red oil	.11¾	.12¼	.11¾	.12¼	.11¾	.12¼
No. 2½ color, 200 vis., pale filtered	.11	.12	.11	.12	.11	.12
No. 2½ color, 300 vis., pale filtered	.12	.13	.12	.13	.12	.13
No. 2½ color, 500 vis., pale filtered	.14½	.15	.14½	.15	.14½	.15
No. 2½-3 color, 750 vis., pale filtered	.17	.19	.17	.19	.17	.19
CALIFORNIA—						
130 vis., 2½-3 color	.10¼	.10½	.10¼	.10½	.10¼	.10½
200 vis., 2½-3 color	.11½	.11¾	.11½	.11¾	.11½	.11¾
300 vis., 3-3½ color	.13	.13½	.13	.13½	.13	.13½
350 vis., 3½-4 color	.13½	.13¾	.13½	.13¾	.13½	.13¾
400 vis., 3½-4 color	.15	.15½	.15	.15½	.15	.15½
Red Neutral:						
200 vis., 4½-5 color	.11	.11¼	.11	.11¼	.11	.11¼
300 vis., 5-6 color	.12	.12¼	.12	.12¼	.12	.12¼
400 vis., 5-6 color	.13¼	.14	.13¼	.14	.13½	.14
500 vis., 4½-5 color	.14¼	.15½	.14¼	.15½	.14¼	.15½
500 vis., 5-6½ color	.15	.15¼	.15	.15¼	.15	.15¼
600 vis., 6½ plus color	.16	.16¼	.16	.16¼	.16	.16¼

Note—Bright stocks are not manufactured commercially on the Pacific Coast.

NEW YORK (BAYONNE) REFINERY PRICES

	Oct. 8		Oct. 1		Sept. 24	
Gasoline, U. S. Motor, 58-60, 437	.08¾	.09	.08¾	.09	.08¾	.09
Kerosene, water white, 41-43	.07¾		.08		.08	
*Fuel Oil, Bunker "C," 14-16, per bbl.	1.05		1.05		1.05	
†Fuel Oil, Diesel, 28-30, per bbl.	2.00		2.00		2.00	
Gas Oil, 32-36 gravity	.05¼		.05¼		.05¼	
25 pale Paraffin Oil	.10½		.10½		.10½	
32 pale Paraffin Oil	.07¼		.07¼		.07¼	
285 red Paraffin Oil	.11½		.11½		.11½	
250 red Paraffin Oil	.11		.11		.11	
225 red Paraffin Oil	.09½		.09½		.09½	
200 red Paraffin Oil	.09		.09		.09	
Refined Wax:						
120-122 a.m.p., per lb.	.04		.04		.04	
125-127 a.m.p., per lb.	.04¼		.04¼		.04¼	
130-132 a.m.p., per lb.	.05½		.05½		.05½	
133-135 a.m.p., per lb.	.06⅛		.06⅛		.06⅛	
135-137 a.m.p., per lb.	.06¼		.06¼		.06¼	
Petrolatum in barrels, carload lots, per pound:						
Dark Green	.019		.019		.019	
Amber	.03⅝		.03⅝		.03⅝	
Extra Amber	.03⅞		.03⅞		.03⅞	
Cream	.06⅜		.06⅜		.06⅜	
Lily White	.07⅜		.07⅜		.07⅜	
Snow White	.08⅜		.08⅜		.08⅜	

*Lighterage 5.0 cents a barrel extra. †Lighterage 6.5 cents a barrel extra.

NEW YORK (BAYONNE) EXPORT PRICES

	Oct. 8		Oct. 1		Sept. 24	
Kerosene, prime white	.07¾		.07¾		.08	
Kerosene, water white	.09		.09		.09	
600, steam refined cylinder stocks, in bbls.	.30		.28	.29	.28	.29
635, steam refined	.32		.31	.32	.31	.32
650, steam refined	.36		.35	.36	.35	.36
600, Pennsylvania Flash	.43		.42		.42	
630, Pennsylvania Flash	.47		.46		.46	
600, Warren E	.47		.40		.40	
600, Oil City, E	.41		.39		.39	
Light 140-150 Bright Stocks	.60	.61	.60		.60	
Dark 140-150 Bright Stocks	.58	.59	.58		.58	

LOS ANGELES EXPORT PRICES

	Oct. 8		Oct. 1		Sept. 24	
Kerosene, water white	.04½	.05	.04½	.05	.04½	.05
U. S. Motor Gasoline, 53-55, 437 e.p.	.07	.07½	.07	.07½	.07	.07½

CRUDE OIL PRICES

OKLAHOMA, KANSAS, NORTH AND EAST CENTRAL TEXAS

Corsicana heavy (January 11)* ..... .80
Other fields .....See gravity table

*Posted by Magnolia Petroleum Co.

TEXAS PANHANDLE

Gray County, Wheeler County and Carson-Hutchinson Counties—See gravity table.

WEST TEXAS

Iatan* .....Same as North Texas
Crane-Upton-Crockett, Pecos, Winkler, Mitchell, and Glasscock (See gravity table).
Chalk† ..... .65

*Includes Howard County and Westbrook Fields.
†Posted by Humble Oil & Refining Co.

ARKANSAS-NORTH LOUISIANA

Smackover, below 24 gravity (May 20, 1929) .....$ .85
Smackover, 24 gravity and above (May 20, 1929) 1.00
Cotton Valley (Below 36 gravity May 22) ..... .85
Bellevue (May 29, 1929) 1.30
Urania (May 21, 1929) 1.10
East El Dorado (May 22, 1929) ..... .85
Other fields.....See gravity table

Cotton Valley crude above 36 gravity takes same gravity price schedule as shown for North Louisiana and Arkansas crude in Mid-Continent gravity price table.

Note—Smackover, Cotton Valley and Bellevue posted by Standard Oil Co. of Louisiana, and Magnolia Petroleum Co.; Urania posted by Louisiana Oil Refining Corp.; East El Dorado, Magnolia Petroleum Co.

GULF COAST

Grade A (May 20)* $1.30
Grade B .....See gravity table
Jennings, La. (March 14)† 1.05
Saratoga, Batson, Dayton (March 14, 1927)‡ 1.20
Markham (March 14)‡ 1.00
High Island (December 14)¶ 1.00

*Humble Oil & Refining Co., The Texas Company, Gulf Pipe Line Co., and Sun Pipe Line Co. †Gulf Pipe Line Co. ‡Sun Pipe Line Co. §The Texas Company.
¶Posted by Gulf Pipe Line Co.

ROCKY MOUNTAIN STATES
Ohio Oil Co.-Midwest Refining Co.
(Effective May 21, 1929)

Rock Creek, Wyo. $1.40
Salt Creek .....See gravity table
Big Muddy 1.43
Grass Creek, heavy (July 27, 1928) ... .90
Grass Creek, light 1.65
Mule Creek 1.20
Elk Basin 1.65
Lance Creek 1.68
Poison Spider (March 14, 1927) 1.00
Notches (March 14, 1927) ..... .65
Rex Lake (February 22) 1.10
Osage 1.65
Lost Soldier (contract, May 22) 1.05
Hamilton Dome (March 14, 1927) ..... .85
Pedro 1.35
Greybull 1.65
Four Bear ..... .85
Cat Creek (Montana) (July 27, 1928).. 1.48

(Continued on Page 230)

CRUDE OIL GRAVITY TABLE

Gravity—	Okla., Kans., N. C. Texas 1	No. La and Arkansas 2	Crane, Upton, Crockett, Winkler, Howard, Pecos, Texas crudes, and Les. N. Mex. 3	Stephens, Ark. 4	Wheeler (Texas Panhandle) 5	Gray County (Texas Panhandle) 6	Carson and Hutchinson (Texas Panhandle) 7	Salt Creek, Wyo. 8	Grade B and Light Crude (G. Coast) 9	Somerset (South Central Texas) 10
24 and above	....	....	....	....	....	....	....	....	....	....
Below 24	....	....	....	....	....	....	....	....	....	....
Below 25	.85	....	.70	....	....	....	....	....	1.15	....
25 to 25.9	.90	....	.74	....	....	....	....	....	1.18	....
26 to 26.9	.95	....	.78	....	....	....	....	....	1.21	....
27 to 27.9	1.00	....	.82	....	....	....	....	....	1.24	....
Below 28	....	1.00	....	.90	.90	.90	.90	....	....	....
28 to 28.9	1.05	1.05	.86	.94	.90	.90	.90	....	1.27	....
29 to 29.9	1.10	1.10	.90	.98	.90	.95	.90	1.10	1.30	....
30 to 30.9	1.15	1.15	.94	1.02	.95	1.00	.90	1.15	1.33	....
31 to 31.9	1.20	1.20	.98	1.06	1.00	1.05	.90	1.20	1.36	....
32 to 32.9	1.25	1.25	1.02	1.10	1.05	1.10	.95	1.25	1.39	1.00
33 to 33.9	1.30	1.30	1.06	....	1.10	1.15	1.00	1.30	1.42	1.07
34 to 34.9	1.35	1.35	1.10	....	1.15	1.20	1.05	1.35	1.45	1.09
35 to 35.9	1.40	1.40	1.14	....	1.20	1.25	1.10	1.40	1.48	1.11
36 to 36.9	1.45	1.45	1.18	....	1.25	1.30	1.15	1.45	....	1.13
37 to 37.9	1.50	1.50	....	....	1.30	1.35	1.20	1.50	....	1.15
38 to 38.9	1.55	1.55	....	....	1.35	1.40	1.25	....	....	1.17
39 to 39.9	1.60	1.60	....	....	1.40	1.45	1.30	....	....	....
40 to 40.9	1.65	1.65	....	....	1.45	1.50	1.35	....	....	....
41 to 41.9	1.70	1.70	....	....	1.50	1.55	1.40	....	....	....
42 to 42.9	1.75	1.75	....	....	1.55	1.60	1.45	....	....	....
43 to 43.9	1.80	1.80	....	....	1.60	1.65	1.50	....	....	....
44 and above	1.85	1.85	....	....	1.65	1.70	1.55	....	....	....

Column 1, Note—Magnolia Petroleum Co. posted schedule May 20, 1929, making price below 26 gravity 70 cents per barrel, 26-26.9 gravity 75 cents, 27-27.9 gravity 85 cents, 28-28.9 gravity 90 cents, 29-29.9 gravity 95 cents, 30-30.9 gravity $1.05, and 31-31.9 gravity $1.15 with balance of the price schedule as shown above.

Oklahoma—Carter Oil Co., Prairie Oil & Gas Co., Sinclair Oil & Gas Co., Gypsy Oil Co., The Texas Company, May 20.

North Central Texas—Including Ranger, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie, Nocona and Moran, Prairie Oil & Gas Co., Sinclair Oil Refining Co., Humble Oil & Refining Co., The Texas Company and Gulf Refining Co., May 20

Kansas—Prairie, Sinclair, The Texas Company and Carter, May 20.

Column 2—Arkansas and North Louisiana—(Caddo, Bull Bayou, Crichton, Cotton Valley, above 36 gravity, DeSoto, Haynesville, Homer and El Dorado only) May 22, Standard Oil Co. of Louisiana, Louisiana Oil Refining Co., Gulf Refining Co., Magnolia Petroleum Co., schedule applies to Pine Island, Haynesville, Bull Bayou, Louisiana and El Dorado, Ark., light crude.

Column 3—Humble Oil & Refining Co. and Magnolia Petroleum Co., May 20.

Column 4—Atlantic Oil Producing Co., Prairie Oil & Gas Co., Louisiana Oil Refining Corp., May 21, 1929.

Columns 5, 6 and 7—Humble Oil & Refining Co., Magnolia Petroleum Co., May 20, 1929.

Column 8—Midwest Refining Co., May 20, 1929. All crude over 37 gravity $1.50 per barrel.

Column 9—Humble Oil & Refining Co., May 20, 1929, (schedule ends 35 and above.)

Column 10—Grayburg Pipe Line Co. and Pioneer Oil & Refining Co., April 7.

CALIFORNIA CRUDE OIL PRICES

Standard Oil Co.-Union Oil Co. (Effective January 18, 1929

Gravity—	Salt Lake, Potrero, Newport, Long Beach, Summerland, Lawndale, Los Angeles, Fullerton, Richfield, Torrance, Olinda-Brea, Alamitos Heights, Signal Hill, Seal Beach, Huntington Beach, Athens, Inglewood, Rosecrans-Domingues, Watsonville 1	Whittier, La Habra, Coyote Hills 2	Midway-Sunset, Elk Hills, Lost Hills, Belridge, Buena Vista Hills 3	Montebello 4	Santa Fe Springs 5	Santa Maria Coalinga 6	Wheeler Ridge Fruitvale 7	Orcutt Ventura, Rincon 8	Ventura Ave. 9	Elwood Terrace 10
14 to 14.9	.70	.70	.50	.70	....	.50	.50	.45	.70	....
15 to 15.9	.70	.70	.50	.70	....	.50	.50	.45	.70	....
16 to 16.9	.70	.70	.50	.70	....	.50	.50	.45	.70	....
17 to 17.9	.70	.70	.50	.70	....	.50	.50	.45	.70	....
18 to 18.9	.75	.75	.56	.70	....	.56	.56	.70	.75	....
19 to 19.9	.80	.80	.62	.75	....	.62	.62	.70	.80	....
20 to 20.9	.85	.84	.68	.80	....	.68	.68	.70	.85	....
21 to 21.9	.89	.88	.74	.85	.89	.74	.74	.86	.86	....
22 to 22.9	.93	.91	.80	.90	.93	.80	.80	.87	.87	....
23 to 23.9	.97	.94	.85	.95	.95	.85	.85	.90	.90	....
24 to 24.9	1.01	.97	.90	.98	.98	.88	.88	.94	.94	....
25 to 25.9	1.05	1.00	.95	1.01	1.01	.91	.91	.98	.98	....
26 to 26.9	1.09	1.04	1.00	1.04	1.04	.94	.94	1.02	1.02	....
27 to 27.9	1.13	1.08	1.05	1.07	1.07	.98	.97	....	1.06	....
28 to 28.9	1.17	1.12	1.10	1.10	1.10	1.02	....	....	1.10	....
29 to 29.9	1.21	1.16	1.16	1.13	1.13	1.06	....	....	1.14	....
30 to 30.9	1.25	1.20	1.22	1.16	1.20	1.10	....	....	1.18	....
31 to 31.9	1.30	....	1.28	....	1.25	1.14	....	....	1.22	....
32 to 32.9	1.35	....	1.34	....	1.30	1.18	....	....	1.28	....
33 to 33.9	1.41	....	1.40	....	1.35	1.22	....	....	1.34	....
34 to 34.9	1.47	....	1.46	....	1.40	1.26	....	....	1.40	1.16
35 to 35.9	1.53	....	....	....	1.45	1.30	....	....	1.46	1.22
36 to 36.9	1.59	....	....	....	1.50	....	....	....	1.52	1.28
37 to 37.9	1.65	....	....	....	1.55	....	....	....	1.58	1.34
38 to 38.9	1.71	....	....	....	1.60	....	....	....	1.64	1.40
39 to 39.9	1.77	....	....	....	1.65	....	....	....	1.70	1.46
40 to 40.9	1.83	....	....	....	....	....	....	....	1.76	1.52
41 to 41.9	1.89	....	....	....	....	....	....	....	1.82	1.58
42 to 42.9	1.95	....	....	....	....	....	....	....	1.88	1.64

Kern River, Newhall-McKittrick, Mount Poso and Round Mountain 11 to 13.9 gravity 45 cents, 14 gravity and above 50 cents, effective October 2, 1929. On December 1, 1928, the Union Oil Co. posted Midway-Sunset, Elk Hills, Buena Vista, Lost Hills and Coalinga crude as follows: 11 to 13.9 gravity at 45 cents, 14 gravity and above 50 cents.

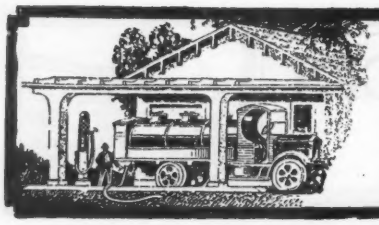
Column 1—Signal Hill, Seal Beach, Huntington Beach and Alamitos Heights crude, 14 to 32.9 gravity, inclusive; Richfield, Olinda-Brea and Fullerton, 14 to 30.9 gravity; Torrance and Inglewood, 14 to 28.9 gravity; Domingues and Athens-Rosecrans, 24 to 42.9 gravity.

Column 2—Whittier crude, 14 to 22.9 gravity; Coyote Hills, 14 to 30.9 gravity.

Column 3—Kern River, Newhall and McKittrick, 11 to 19.9 gravity; Midway-Sunset, Buena Vista and Elk Hills, 11 to 33.9 gravity; Lost Hills, 11 to 34.9 gravity; oil below 14 gravity posted at 45 cents.

Column 4—Oil below 14 gravity posted at 45 cents.

Columns 8 and 9—Posted by Union Oil Co. only.



TANK WAGON MARKETS

Tank wagon quotations for gasoline and kerosene in United States as furnished by the larger marketing concerns Oct. 8

ALL TANK WAGON AND SERVICE STATION QUOTATIONS INCLUDE TAXES

STANDARD OIL CO. (INDIANA)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Chicago dist.†..	19.0	20.0	3.0	13.0
Decatur, Ill. ...	19.2	20.2	3.0	13.1
E. St. Louis ...	18.4	17.4	3.0	12.2
Joliet	19.4	20.4	3.0	13.2
Peoria	19.2	20.2	3.0	13.1
Quincy	19.2	20.2	3.0	12.9
Davenport, Ia..	19.5	20.5	3.0	13.3
Des Moines ...	19.5	20.5	3.0	13.3
Keokuk	19.5	20.5	3.0	13.3
Sioux City	19.1	20.1	3.0	12.9
Duluth, Minn..	20.5	21.5	3.0	13.9
Mankato	20.1	21.1	3.0	13.7
Minneapolis ...	20.2	21.2	3.0	13.9
LaCrosse, Wis..	19.2	20.2	3.0	14.0
Milwaukee ...	19.1	19.1	3.0	12.9
Madison	18.3	17.3	3.0	13.1
Detroit, Mich..	19.8	20.8	3.0	14.7
Grand Rapids..	19.7	20.7	3.0	14.6
Saginaw	19.9	20.9	3.0	14.8
Evansville, Ind.	20.0	21.0	4.0	14.0
Fort Wayne ...	20.4	21.4	4.0	14.4
Indianapolis ..	20.2	21.2	4.0	14.2
South Bend ...	20.4	21.4	4.0	14.4
Fargo, N. D. ..	21.9	22.9	3.0	15.9
Huron, S. D. ..	21.2	22.2	4.0	14.7
Sioux Falls	20.1	21.1	4.0	14.4
K. C., Mo.* ...	18.9	19.9	3.0	11.6
Springfield* ...	18.8	19.8	3.0	12.5
St. Louis ...	17.6	18.6	2.5	12.2
St. Joseph	18.5	19.5	2.0	12.2
Wichita, Kans.	17.6	18.6	3.0	11.6
Bartlesville, Ok.	18.5	19.5	4.0	11.5

*State tax 2 cents; remainder city tax.
†Effective February 20, discounts on Q.D.A. in Chicago district 2 cents off service station price on purchases of 500 gallons or more per month and 4 cents on purchases of 1,000 gallons or more per month

NAPHTHA

	Tank wagon	Tank car
Oleum spirits	15.7	12.9
V. M. & P. Naphtha	17.2	13.9
Cleaner's naphtha	17.0	14.9
Stanisol	18.0	15.4

Tank wagon prices f.o.b. Chicago; tank car prices f.o.b. Whiting.

STANOLIND FURNACE OIL IN CHICAGO

Less than 100 gallons	9.0
100 to 799 gallons	8.0
800 gallons or more	7.5

Note—Outside Chicago furnace oil discount of 1 cent per gallon is given on deliveries of 100 to 349 gallons and 1½ cents on deliveries of 350 gallons or more.

The following quantity discounts from the service station price are allowed on monthly sales of gasoline; 2,000 gallons or less, 2 cents; more than 2,000 and less than 6,000 gallons, 2½ cents; more than 6,000 gallons, 3 cents. Discounts are allowed each month, and they are not cumulative. Delivery tickets showing date and quantity delivered must be sent to the seller before the tenth of the month to secure the discount on the previous month's purchases.

SOUTHWESTERN DISTRICT

Magnolia Petroleum Co.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Dallas, Tex. ...	17.0	21.0	4.0	13.0
Fort Worth ...	17.0	20.0	4.0	12.0
Houston	13.0	17.0	4.0	11.0
San Antonio ...	17.0	21.0	4.0	11.0
El Paso	15.0	18.0	4.0	16.0
Texarkana	17.0	19.0	4.0	12.0
Muskogee, Ok.*	17.0	20.0	4.0	13.0
Okla. City* ...	17.0	20.0	4.0	10.0
Tulsa*	15.0	19.0	4.0	10.0
Ft. Smith, Ark.	15.0	17.0	5.0	12.0
Little Rock ..	19.0	23.0	5.0	13.0

*Gasoline tank wagon price to dealers 2 cents under posted tank wagon.

ROCKY MOUNTAIN DISTRICT

Continental Oil Co.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Denver, Colo...	18.0	21.0	4.0	15.5
Pueblo	18.0	21.0	4.0	15.5
Grand Junction	22.5	25.5	4.0	19.0
Casper, Wyo. ..	21.0	24.0	4.0	14.0
Cheyenne	22.0	25.0	4.0	15.5
Butte, Mont. ..	25.5	28.5	5.0	20.0
Helena	25.5	28.5	5.0	20.0
Salt Lake, Utah	22.0	25.0	3.5	17.0
Albu'que, N. M.	21.0	24.0	5.0	17.0
Boise, Idaho ..	24.5	27.5	4.0	19.0
Twin Falls	24.5	28.5	4.0	19.0

PENNSYLVANIA—DELAWARE AND PART NEW ENGLAND

The Atlantic Refining Co.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Pittsburgh, Pa..	16.0	*22.0	...	13.0
Philadelphia ..	16.0	*22.0	...	13.0
Scranton	16.0	*22.0	...	13.0
Allentown	16.0	*22.0	...	13.0
Altoona	16.0	*22.0	...	13.0
Erie	13.0	*17.0	...	13.0
Dover, Del. ...	19.0	21.0	3.0	13.0
Wilmington ...	19.0	21.0	3.0	13.0
Springf'd, Mass.	18.0	20.0	2.0	15.0
Worcester	18.0	20.0	2.0	15.0
Boston	18.0	20.0	2.0	15.0
Providence, R.I.	18.0	20.0	2.0	13.0
Hartford, Conn.	18.0	20.0	2.0	14.0
New Haven ...	18.0	20.0	2.0	15.0

*Includes tax of 4.0 cents. Pennsylvania tax is collected by the dealer and paid by him direct to the State. The Atlantic Refining Co. recognizes a 2-cent per gallon discount on gasoline from its posted tank wagon markets on sales to dealers for purposes of resale. The Atlantic Refining Co. also recognizes a maximum discount of 2 cents per gallon on gasoline to commercial accounts under contract for one year.

NEW YORK AND PART OF NEW ENGLAND DISTRICT

Standard Oil Co. (New York)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Albany, N. Y...	18.0	20.0	2.0	15.0
New York* ...	16.0	18.0	2.0	15.0
Buffalo	18.0	20.0	2.0	14.0
Rochester	18.0	20.0	2.0	14.0
Syracuse	18.0	20.0	2.0	15.0
Boston, Mass...	18.0	20.0	2.0	15.0
Augusta, Me....	20.0	22.0	4.0	15.0
Manch't'r, N.H.	20.0	22.0	4.0	15.0
Burlington, Vt..	19.0	20.0	4.0	15.0

*Prices in steel barrels.

SOUTHERN DISTRICT

Standard Oil Co. (Kentucky)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Atlanta, Ga. ...	20.0	22.0	4.0	16.5
Augusta	20.0	22.0	4.0	15.5
Macon	23.0	25.0	4.0	16.5
Savannah ...	22.0	24.0	4.0	15.5
Birm'ham, Ala..	19.0	21.0	4.0	13.0
Mobile	20.0	22.0	4.0	15.0
Montgomery ...	21.0	23.0	4.0	16.5
Clarksdale, Miss..	18.0	20.0	5.0	12.5
Jackson	21.0	23.0	5.0	13.0
Natchez	20.5	20.5	5.0	14.0
Gulfport	22.5	24.5	5.0	14.0
Vicksburg	20.5	22.5	5.0	14.0
Jack'ville, Fla..	22.0	24.0	6.0	14.5
Miami	23.0	25.0	6.0	15.5
Pensacola	23.0	25.0	6.0	14.5
Tampa	22.0	24.0	5.0	14.5
Lexington, Ky..	20.0	22.0	5.0	15.5
Covington	21.0	22.0	5.0	15.5
Louisville	21.0	23.0	5.0	15.0
Ashland	18.0	19.0	5.0	15.5
Catlettsburg ..	18.0	19.0	5.0	15.5

In addition to the state tax of 4 cents on gasoline, Montgomery has city tax of 1 cent on gasoline and one-half cent on kerosene. Kerosene prices in Georgia include 1-cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene and one-fortieth cent on gasoline. Pensacola and Mobile taxes include 1-cent city levy. Gulfport tax includes privilege tax of 2 cents in addition to state tax.

Effective April 2, price to dealers 2 cents under posted tank wagon price.

PACIFIC COAST TERRITORY

Standard Oil Co. (California)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
San Francisco.	20.0	24.0	3.0	15.5
Los Angeles ..	19.5	23.5	3.0	15.5
Reno, Nev.	24.0	26.0	4.0	19.0
Portland, Ore ..	20.5	24.5	3.0	16.5
Seattle, Wash..	20.5	23.5	3.0	16.5
Tacoma	20.5	23.5	3.0	16.5
Spokane	24.5	27.5	3.0	20.5
Phoenix, Ariz..	18.0	22.0	4.0	20.5

NEBRASKA

Standard Oil Co. (Nebraska)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Omaha	20.25	22.25	4.0	13.25
McCook	21.75	23.75	4.0	14.75
Norfolk	20.75	22.75	4.0	13.75
N. Platte	21.75	23.75	4.0	14.50
Scottsbluff	21.75	23.75	4.0	14.25

ATLANTIC COAST DISTRICT

Standard Oil Co. (New Jersey)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Atlantic City ..	16.0	18.0	2.0	13.0
Newark, N. J.	18.0	20.0	2.0	13.0
Annapolis, Md	20.0	22.0	4.0	13.0
Baltimore	20.0	22.0	4.0	12.0
Cumberland ...	20.0	22.0	4.0	13.0
Washington ...	18.0	20.0	2.0	12.0
Danville, Va. ..	21.0	23.0	5.0	12.0
Norfolk	21.0	23.0	5.0	13.0
Petersburg	21.0	23.0	5.0	13.0
Roanoke	20.0	21.0	5.0	13.0
Richmond	21.0	23.0	5.0	13.0
Charles'n, W.Va.	20.0	22.0	4.0	13.0
Keyser	20.0	22.0	4.0	13.0
Parkersburg ...	20.0	22.0	4.0	13.0
Wheeling	20.0	22.0	4.0	13.0
Charlotte, N. C.	21.0	23.0	5.0	13.0
Hickory	21.0	23.0	5.0	13.0
Mt. Airy	21.0	23.0	5.0	13.0
Salisbury ..	21.0	20.0	5.0	13.0
Charleston, S.C.	22.0	24.0	6.0	13.0
Columbia	22.0	24.0	6.0	13.0

A 2-cent per gallon discount off the gasoline tank wagon price is offered to dealers.

OHIO

Standard Oil Co. (Ohio)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Ohio points* ..	19.0	20.0	4.0	†13.0

*Dealers and commercial accounts 2 cents under tank wagon.
†Service station price 15 cents.

CENTRAL SOUTH DISTRICT

Standard Oil Co. (Louisiana)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
N. Orleans, La.*	15.0	17.0	5.0	13.0
Baton Rouge ..	20.0	20.0	4.0	14.5
Alexandria	19.0	21.0	5.0	16.0
Lafayette†	20.0	22.0	5.0	14.0
Lake Charles.†.	20.5	22.5	5.0	16.0
Shreveport	19.5	21.5	4.0	15.0
Knoxv'le, Tenn.	20.0	22.0	5.0	16.0
Memphis	20.0	22.0	5.0	12.5
Chattanooga ..	20.0	22.0	5.0	14.0
Nashville	19.0	19.0	5.0	16.0
Bristol	21.0	22.0	5.0	14.0
Lt. Rock, Ark..	21.0	23.0	5.0	13.0

*Tax of 5 cents includes city tax of 1 cent. Louisiana Kerosene prices include 1-cent state tax and 1-cent parish tax.
†Includes 1-cent parish tax.

TANK WAGON CHANGES

September 23—Standard Oil Co. of New Jersey advanced the gasoline tank wagon price 2 cents and announced a 2-cent discount off the tank wagon price to all dealers.

September 27—Standard Oil Co. of Louisiana reduced both the gasoline tank wagon and station prices to 19 cents in Nashville, Tenn.

On the same date the gasoline tank wagon and station prices were reduced 1½ cents in New Orleans, La., to 15 cents and 17 cents.

September 30—Standard Oil Co. of Kentucky reduced the gasoline tank wagon price 2 cents to 20½ cents.

CRUDE PRICE CHANGES

October 2—Ohio Oil Co. reduced western Kentucky crude 15 cents per barrel to $1.68.

INSTITUTE SELECTS NEW BOARD MEMBERS

Edgar J. Marston, president of the Texas Pacific Coal & Oil Co.; F. A. Leovy, president of the Gulf Production Co. and the Gulf Pipe Line Co.; and George R. Nutty, president of the Gulf Oil Corp., were elected to the board of directors of the American Petroleum Institute at a meeting of the board in Tulsa, Friday.

Mr. Marston represents the natural gasoline industry on the board succeeding D. E. Buchanan who resigned. Mr. Leovy succeeds George S. Davison, former head of the Gulf companies, who recently resigned his position to devote his time to other interests. Mr. Nutty succeeds the late Edward Prizer, chairman of the board of directors of the Vacuum Oil Co.

At the board meeting Sam Fitzpatrick, J. Edgar Pew and W. R. Boyd, Jr., were made members of a committee to draw up resolutions expressing the regret of the industry over the death of Mr. Prizer for several years as an active member of the board of directors.

GOSLIN-BIRMINGHAM SHOWING

The Goslin-Birmingham Manufacturing Co., Birmingham, Ala., one of the last concerns to obtain exhibition space at the International Petroleum Exposition, is showing the Vallez filter for contact filtration and dewaxing Booth No. 45 in the Scientific and Technical Building. Philip De Wolf is in charge of the exhibit.

CRUDE OIL PRICES

(Continued from Page 229)

Sunburst (Montana) (May 23, 1929) ...	1.75
Torchlight	1.65
Hogback (New Mexico)	1.70

Note—Salt Creek, Osage, Cat Creek, Greybull and Hogback posted by Midwest Refining Co., and the remainder by the Ohio Oil Co. Both companies post Grass Creek light and Elk Basin.

SOUTH CENTRAL AND SOUTHWESTERN TEXAS

Luling (May 2)*	$ .90
Mirando (May 20, 1929)†	.90
Salt Flat (May 20, 1929)‡	1.25
Rockdale Motley (April 1st)	
Below 28 gravity	1.25
38-38.9 gravity	1.27
39-39.9 gravity	1.29
40 and above	1.31
Pettus	...
Callihan (May 15)	1.75
Lytton Springs (Lockhart) See gravity table	
Somerset .....See gravity table	

*Posted by Magnolia Petroleum Co.
†Magnolia Petroleum Co., Humble Oil & Refining Co., Crown Central Pipe Line Co
‡Thrall prices same as North Central Texas less 19½ cents per cwt. freight.
§Humble Oil & Refining Co.

EASTERN STATES
Joseph Seep Purchasing Agency
(Effective October 1, 1929)

Penna. Grade Oil in New York Transit Lines (New York)	$3.08
Bradford District Oil in National Transit Lines (Pennsylvania)	3.08
Penna Grade Oil in National Transit Lines (Pennsylvania)	3.08
Penna Crude Oil in Southwest Pennsylvania Lines (West Virginia)	3.00
Penna Grade Oil in Eureka Pipe Line Lines (Pennsylvania)	2.90
Penna Grade Oil in Buckeye Pipe Line Lines (Ohio)	2.70
Cabell Grade Oil in Eureka Pipe Line Lines (West Virginia) (May 22, 1929)	1.75
Corning Grade Oil in Buckeye Pipe Line Co.'s Line (May 22, 1929).	1.80
Corning Grade Oil in Buckeye Pipe Line Co.'s Lines (May 22, 1929).	1.90
Somerset Cumberland Pipe Line Lines (Kentucky) (May 22, 1929) ..	1.80
Ragland Grade Oil in Pure Pipe Line Lines (Kentucky) (Jan. 29) ...	.60

MIDDLE WESTERN STATES
Ohio Oil Co.
(Effective May 21 1929)

Lima	$1.80
Wooster	1.90
Illinois	1.75
Indiana	1.57
Princeton	1.75
Plymouth	1.23
Waterloo (November 17, 1926)	1.35
Western Kentucky	1.68
Dundee, Mich. (Sept. 17, 1929) ‖	
.. Same as Mid-Continent gravity scale	
Upper and Lower Traverse sands, Mich.‖	
. Same as Mid-Continent gravity scale	
Midland, Mich. (June 3, 1929)*	1.70
Saginaw, Mich. Saginaw Sand (February 10)†	1.89
Saginaw, Mich. Berea Sand (February 10)†	1.79
Cumberland, Clay, Barren, Clinton and Monroe Counties, Kentucky (March 15)‡	1.50
Oil in line in Stoll Oil Refining Co in Oil City, Ky. (June 1, 1929)§	1.80
Oil Springs (Canada)¶	2.27
Petrolia (Canada)¶	2.20

*Poted by Pure Oil Co.
†Posted by Sun Oil Co.
‡Posted by Paragon Development Co
§Posted by Stoll Oil Refining Co.
¶Posted by Imperial Oil Co., Ltd.
‖Posted by Standard of Indiana for bonded shipment.

MEXICAN CRUDE

Panuco*	$ .640

*Based on August transactions. Price exclusive of taxes

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Statement to California Stockholders

President Kingsbury Explains Purchase of Pacific Public Service Gas Co. News of Other Petroleum Issues

President K. R. Kingsbury, in announcing the Standard Oil Co. of California's acquisition of control of the Pacific Public Service Co. and its subsidiaries, says the executive management of the several companies remains unchanged the executives now in charge having agreed to remain.

"It is the intention of the Standard Oil Co. of California to retain the control lately acquired and there have been no negotiations for the disposition of control nor any contemplated, rumors to the contrary notwithstanding. On the contrary, the Standard Oil Co. contemplates the further development of the properties and hopes for the continued prosperity of the companies involved. With particular reference to reports of conflict with the interests of the Pacific Gas & Electric Co. concerning the distribution of natural gas, the Standard Oil Co. wishes to state there there is no conflict. The territory served by the Coast Counties Gas & Electric Co. and by the Pacific Gas & Electric Co., respectively, has been outlined by the California State Railroad Commission.

"With reference to the Coast Counties Gas & Electric Co. the Standard Oil Co. plans to bring natural gas to the areas served by that company. It hopes this will mark a new era of industrial development in these regions which will be of great benefit to the entire community."

The purchase was made for the purpose of furthering the deveopment and use of natural gas. The Standard Oil Co. of California owns in fee approximately 50 per cent of Kettleman Hills. During the past year development has indicated an enormous potental natural gas production in addition to crude oil. This holding, together with other of its gas bearing lands, will enable the company to provide natural gas not only to its present customers, but to the rapidly growing industrial development in the area served by the Coast Counties Gas & Electric Co. This purchase is significant also in that it is developing additional outlets for natural gas at a time when the new California gas conservation bill, which prohibits the waste of natural gas, becomes effective.

New Bradford

Stockholders of New Bradford Oil Co. authorized purchase of approximately 80 per cent of the outstanding stock of Argo Oil Co. at $3 a share. Approximately 145,000 shares will be purchased for cash and 387,000 shares will be paid for in New Bradford stock at $5 a share. Stockholders also authorized extension of the offer to minority stockholders for exchange of shares on the same basis.

Independent Oil & Gas

Independent Oil & Gas Co. declared the regular quarterly dividend of 50 cents, payable October 31 to stock of record October 14.

Mid-Continent Petroleum

Mid-Continent Petroleum Corp. declared regular quarterly dividend of 50 cents on common, payable November 15 to stock of record October 15.

Cosden Oil

Cosden Oil Co. and subsidiaries in August earned $404,081 before depreciation, depletion and Federal taxes, compared with $334,614 in July. In the first eight months this year profit was $1,941,407 before reserves.

Salt Creek Producers

Salt Creek Producers Association declared the regular quarterly dividend of 50 cents, payable November 1 to stock of record October 15. Three months ago the quarterly dividend rate was reduced to 50 cents from 75 cents.

Richfield Oil

October 2 Richfield Oil Co. of California declared its regular quarterly dividend of 50 cents per share on all common stock outstanding as of October 20, 1929, payable November 15.

Standard of Kentucky

In line with improved profits of oil refining and marketing companies, Standard Oil of Kentucky, operating in the southern tier of states, is enjoying an increased volume of business on a better profit basis this year. The company's net profits in the first seven months were around $5,000,000, some 25 per cent better than the like 1928 period. Due to the warm climate in the area in which it does the bulk of its marketing, Kentucky's sales volume the latter part of the year is larger than for most companies.

Kentucky's net is being estimated at between $8,500,000 and $9,000,000. This would equal from $3.30 to $3.50 a share on the 2,565,460 shares of $10 par stock issued. Last year's net of $4,475,604 was equal to $1.85 on present shares. Capital was changed late in 1928 by 2½-for-one split, with reduction in par, and a 50 per cent stock dividend. Present stock pays $1.60 annual dividend.

Indian Refining

Indian Refining Co. and subsidiaries report for the six months ended June 30, 1929, net profit of $319,442, after interest, depreciation, etc., equivalent after dividend requirements on 7 per cent preferred stock, to 22 cents a share (par $10), on 1,250,032 shares of common stock. This compares with $110,533 or 3 cents a share on 785,068 common shares in the first six months of 1928.

Consolidated income account of Indian Refining and subsidiaries for six months ended June 30, 1929, follows: Net sales, $8,699,314; costs and expenses, $7,759,980; balance, $939,334; miscellaneous charges net, $29,481; depreciation, $446,861; interest and discount, $143,550; net profit, $319,442; preferred dividends, $285,791.

Profits from operation were adversely affected, according to J. H. Graham, president, by the changes in inventory and by operation of certain new equipment which has since proven successful and has greatly reduced manufacturing costs.

Columbian Carbon

Columbian Carbon Co. has decided to issue 41,161 shares of authorized but unissued capital stock and to offer to holders of the voting trust certificates of record October 18 the right to subscribe at $175 a share. Subscriptions will be in the ratio of nine additional shares for each 100 shares held. The subscription privilege will expire November 11. The stock will be deposited under the existing voting trust agreement and voting trust certificates issued to subscribers.

Twenty Representative Stocks

The Oil and Gas Journal's weekly average price of 20 representative petroleum stocks listed on the New York Stock Exchange and New York Curb, based on closing quotations for Saturday, was as follows:

April 27	58.34	July 19	56.83
May 4	58.14	July 26	55.62
May 11	59.75	Aug. 3	55.09
May 18	59.30	Aug. 10	54.15
May 25	57.73	Aug. 17	60.32
June 1	56.45	Aug. 24	60.61
June 8	58.37	Aug. 31	60.90
June 14	57.76	Sept. 7	59.16
June 21	56.76	Sept. 14	60.10
June 28	56.79	Sept. 21	57.93
July 5	56.52	Sept. 28	58.63
July 12	55.09	Oct. 5	57.00

FIGURES WORLD OUTPUT AT 1,467,000,000 BARRELS

The world's oil production in 1929 will total close to 1,467,000,000 bbls., according to Valentin R. Garfias, manager of the foreign oil department of Henry L. Doherty & Co., in a survey of the petroleum production of the world. This is an increase of about 145,000,000 bbls., or nearly 11 per cent, compared with an increase of only 2½ per cent in 1928. The average yearly increase since 1925 has been approximately 100,000,000 bbls. Production in the United States in 1929 should reach 1,010,000,000 bbls., an increase of approximately 12 per cent over 1928, Mr. Garfias believes. This production represents approximately 68.9 per cent of the world's total—about the same as the proportion in 1928 and 1927. This increase is attributed primarily to deeper drilling in the California fields and to the discovery of new pools in Texas and Oklahoma. The average shut-in production is estimated to be from 10 to 15 per cent of the total. In the foreign field, Venezuela, which has risen from fourth to second place in three years, will show, as is forecast, the largest increase—29,000,000 bbls. or over 25 per cent more than 1928 figures. Mexico will fall behind Persia in oil production. Since 1927 Mexico has fallen from third to fifth place among the world's oil producers. Should this downward course continue, Mr. Garfias believes that Rumania and possibly Dutch East Indies will outrank Mexico in 1930. Venezuela, in spite of the conservation agreements, has risen from fourth to second place in three years. This year's production is estimated at approximately 25 per cent above 1928. Part of the Mexican decrease may be attributed to publication of the draft of a proposed labor law, while in Colombia publication of a proposed petroleum law also has had a disturbing effect. It is expected, however, that both of those laws will be modified materially before being put into effect. Meanwhile, production in Colombia has been kept up to the capacity of existing pipe lines.

Russia is maintaining itself in third place without difficulty, with an estimated production of 95,500,000 bbls., an

INDEPENDENT OILS ON NEW YORK CURB

Compiled by Francis, Bro. & Co., Kennedy Building, Tulsa, Okla.

1926 High	1926 Low	1927 High	1927 Low	1928 High	1928 Low	1929 High	1929 Low	Par value	Stocks	For week ended October 4 Sales	Open	High	Low	Last	Change
$6.75	.45	2⅛	.55	1½	.53	.72	¼	$5	Amer. Con. Oilfields	5,800	¼	¼	⅛	⅛	— ⅛
..	..	7½	2¾	9½	3½	8⅝	3½	N.P.	Amer. Maracaibo	3,200	3	3½	3	3	...
..	..	2¾	1	4½	2¼	5	1⅞	$10	Argo Oil	400	1⅝	1⅝	1⅝	1⅝	...
85¼	60	40	20½	55	32¾	62	45	N.P.	British American	No sales.					
28⅝	9¼	28¼	15½	4½	3⅞	4¾	2⅝	25c	Carib. Syndicate (new)	3,600	2⅝	2⅞	2	2	— ⅝
..	..	58¾	40¼	90⅞	54	53¼	28⅛	N.P.	Cities Service	191,900	60¾	61	60¼	60¾	— ¼
..	..	95⅜	87	103½	94½	98¾	93½	N.P.	Cities Service, pfd.	100	94⅜	94¼	94⅜	94½	— ⅛
3½	1¾	3⅞	1⅛	3¼	.76	2	⅝	1	Colombia Syndicate	1,400	⅝	¾	⅝	⅝	...
..	..	9¾	6⅜	8⅞	6¼	11⅛	6⅞	10	Consolidated Royalty	700	5¼	5¼	5	5	— ¼
16	10	14⅞	9½	17½	9½	11¾	7⅜	N.P.	Creole Syndicate	23,500	8⅛	8⅜	7¾	7⅞	— ¼
..	..	3	.50	3¼	.76	2½	1¼	N.P.	Crown Central	300	1	1	1	1	...
7⅞	6¾	12	4	33½	3¼	26	11½	N.P.	Darby Petroleum	2,400	11⅝	11⅝	10	10	—1¼
..	..	2½	74	2¼	1	11	2	N.P.	Derby Oil & Ref.	1,900	6¾	7	5¼	6¼	— ¼
..	..	16¾	4	21⅛	7½	44	20⅞	N.P.	Derby Oil & Ref., pfd.	No sales.					
98	92	118	86¼	165	101⅛	209	142⅛	$25	Gulf Oil Corp.	10,100	189⅞	192¾	185	185	—2⅞
$3.00	.83	2½	.80	3⅜	1	2⅞	1⅛	5	Intercontinental Pet.	2,800	1⅜	1⅜	1⅛	1⅛	— ¼
..	..	2¼	1⅛	3	1¼	3⅝	1⅜	N.P.	Kirby Petroleum	900	2⅛	2⅛	2	2	— ½
12¼	5¾	10⅞	5⅛	9⅜	5⅛	6⅛	2⅞	25	Leonard Oil & Dev.	1,900	3¾	3⅞	2¾	3½	— ⅜
27	20	27½	20	43⅞	20	38⅞	23⅛	N.P.	Lion Oil & Ref. Co.	600	32⅞	32⅞	28	28	—1
46	30	59⅜	37	69⅛	48½	50	32¼	N.P.	Lone Star Gas	3,200	67¼	66⅞	64	64	—2
2⅞	1	2⅞	.80	1⅞	.50	1¼	⅜	1	Magdalena Syndicate	1,500	½	½	⅜	½	...
34	12½	52	12	48½	32	38½	20	N.P.	Margay Oil	200	19½	19½	19	19	— ½
8	5½	12⅛	5	8	2¾	6⅜	3⅜	N.P.	Mexico-Ohio Oil	300	2⅞	2⅞	2¾	2¾	...
1¾	1⅛	1½	1	1⅜	.76	1½	⅞	$1	Mountain & Gulf	100	⅞	⅞	⅞	⅞	...
26	23	29¼	22¾	28⅞	19½	22⅞	11⅛	10	Mountain Producers	2,800	11	11⅛	10⅛	10⅛	— ⅞
6⅝	5	5⅞	4⅝	5⅝	4¼	5	3	5	New Bradford	200	3⅛	3⅛	3⅛	3⅛	...
..	..	16	9¼	11⅞	7⅛	9⅜	5½	1	New Mex. & Ariz.	3,000	5⅛	5⅛	5	5	— ⅝
..	..	12¾	9½	14¼	8½	18½	8¾	N.P.	North Central Texas	1,400	12½	12½	11½	11½	— ½
10⅛	5⅞	9⅜	3¼	6	2⅛	3½	⅞	N.P.	Pandem	2,000	..	⅞	⅝	⅝	— ¼
12¼	11⅜	12½	7	15⅝	8½	10¼	5⅛	N.P.	Pantapec Oil	5,700	4¾	4¾	4	4	— ¾
22¾	12	13½	5⅛	7¾	4⅞	7⅜	4⅜	N.P.	Pennok Oil	No sales.					
17	8½	24⅜	7	18	4⅞	16	10	25	Red Bank Oil	200	10	10	10	10	...
30¼	12	15½	3½	12⅞	4⅛	8½	4½	N.P.	Reiter-Foster	3,500	4⅛	4⅛	3⅛	3⅛	—1⅛
7	4½	7	4½	12	4⅛	11	5	N.P.	Ryan Consolidated	500	6	6¼	5⅝	5⅝	— ½
10	7⅛	8	5¼	7¼	5½	5⅞	2	$10	Salt Creek Cons.	400	2⅝	2¾	2⅝	2⅝	— ⅜
35	24⅞	35½	27¼	35	23⅛	25⅞	13	10	Salt Creek Prod.	4,200	13¼	13⅜	13	13⅜	— ⅜
6⅞	1¼	7	1¼	3½	1	2½	1⅛	5	Savoy Oil	No sales.					
92	63½	92	63½	93¼	75	145	82	100	Transcontinental. pfd.	No sales.					
8	4½	7⅜	4¼	9⅛	4¾	6½	3	5	Venezuelan Petrol	3,100	3½	3½	3	3	— ½
8¼	5½	8	4¾	8¼	4⅞	9⅛	4⅛	$1	Woodley Petroleum	1,200	4	4¼	4	4	— ¼
6½	6	6	1¾	8⅜	2⅛	..	..	25	Y Oil & Gas (new)	100	1⅛	1⅛	1⅛	1⅛	— ⅛

TRANSACTIONS IN OIL SHARES ON NEW YORK STOCK EXCHANGE

Quotations Compiled by Francis, Bro. & Co., Members of New York Stock Exchange, Kennedy Building, Tulsa, Okla

1926 High	1926 Low	1927 High	1927 Low	1928 High	1928 Low	1929 High	1929 Low		Listed capital	Par value	Div. rate	Last paid	Stocks	For week ended October 5: Sales	Open	High	Low	Last	Change
82⅞	24¼	37⅝	27⅝	43⅞	27⅛	42⅝	22½	(sh)	922.075	N.P.	50cQ	July 31, 29	Amerada Corp.	2,400	27	27½	26⅛	26⅞	—2⅛
74	39⅞	82⅛	35⅛	85	51⅛	64¾	31	(sh)	209,180	N.P.	.....	.....	American Republics Corp.	4,700	41	42½	30	37	—4
60	44¾	50¼	35	53⅜	37½	47¼	40½		$57,260,300	$25	50cQ	Sept. 30, 29	Associated Oil	19,000	44⅞	45	43⅞	44½	— ⅜
128⅜	97	131⅜	104	66⅜	50	77⅞	53½		50.000.000	25	25cQ*	Sept. 16, 29	Atlantic Refining	34,000	59½	59¾	53⅛	57	—2¼
33½	23½	35½	20¾	53	20	49⅛	33⅛		45.235,650	25	50cQ	Aug. 6, 29	Barnsdall Corp.	114,000	34⅜	35⅜	31½	33	—1½
..	..	..	..	..	..	..	..		4,634.532	N.P.	.....	.....	Continental Oil	46,000	31⅞	32¾	31	31	—1
94½	50	96¾	65	94⅞	68	94¾	61		20.785,400	100	.....	.....	General Asphalt	36,400	81½	87¾	80¾	82⅜	+1⅜
72	50¼	175¾	60⅛	167	79	109.	68½		25.000,000	100	.....	.....	Houston Oil	96,800	95½	98¼	79¾	88¾	—2⅜
34	19⅝	32¾	17⅝	38⅜	21¾	39⅜	29⅛	(sh)	1.333.572	N.P.	50cQ	July 31, 29	Independent Oil & Gas ...	22,400	31	31⅞	29⅛	30¼	— ½
12¾	7½	12⅛	7⅝	39⅝	9	53	29		$12,307,370	$10	.....	May 31, 24	Indian Refining	50,600	44	45	38½	42½	— ⅛
25⅞	16½	37¾	20½	39⅛	27⅜	38⅜	26	(sh)	3.992.122	N.P.	.....	May 1, 27	Lago Oil & Transport ...	No sales.					
19⅞	12	18⅛	10	19¾	9⅜	18	10⅜	(sh)	1,190,063	N.P.	.....	.....	Louisiana Oil Refining ..	38,600	11½	11⅞	10¼	11⅛	+ 1⅝
28	16½	22¾	12	25½	12½	18½	12	(sh)	330.000	N.P.	.....	.....	Maracaibo Oil	2,800	12¾	12¾	11⅝	11⅝	—3⅛
13¾	6	9¼	3	73	4⅝	69⅜	33½	(sh)	1,276.873	N.P.	.....	Dec. 15. 20	Mexican Seaboard	100,900	29¼	34⅜	28	31½	+ 2½
37	20½	39⅜	25½	44½	25⅛	39⅞	30½	(sh)	1.857.912	N.P.	50cQ	Aug. 15, 29	Mid-Continent Petroleum	26,800	32⅜	33	31½	32½	+ ⅜
2½	½	3¾	1⅝	7⅜	2⅜	5⅛	1⅞		24,298,850	10	.....	July 1, 23	Middle States	6,300	2	2	1⅞	2	...
76½	56⅛	65⅞	40⅛	54⅞	38¼	69	40¼		49,997.750	50	.....	Oct. 20, 27	Pan American P. & T. ...	4,100	62½	62¾	60⅞	61½	—1
78⅝	56⅞	66⅜	40¼	58⅞	37⅜	69¼	40½		118,034,739	50	.....	Nov. 15, 24	Pan American P. & T. B.	99,500	62	64½	60⅝	63⅝	+ 1⅛
46	30	37⅞	16¾	28⅝	15½	18½	13⅝	(sh)	400.000	N.P.	.....	Jan. 30, 27	Pan American Western B	23,000	13⅝	13⅝	13⅝	13⅝	...
32	4½	18⅞	8	21⅜	11½	15¼	7⅛	(sh)	199.370	N.P.	.....	.....	Panhandle P. & R.	3,100	7½	7½	5¾	6	—1⅛
99⅜	51	83	54	108	70	76	47½		$2,635.300	$100	.....	July 2, 23	Panhandle P. & R. pfd. ..	100	50	50	50	50	+ ½
57⅜	40	60¼	36¼	53⅞	35¼	47	35	(sh)	2.406,796	N.P.	37½cQ	Oct. 2, 29	Phillips Petroleum	23,100	37¾	38⅜	36⅝	38	+ ⅜
..	..	1⅛	½	5¼	½	3⅜	1½		$29,622,925	$25	.....	.....	Pierce Oil Corp.	8,400	2	2⅛	1¾	1¾	...
7	2¼	5½	2½	7	3½	5⅞	4	(sh)	2.500.000	N.P.	.....	.....	Pierce Petroleum	6,100	4¼	4⅝	4	4	...
60¼	48	55½	45⅝	68	46	65⅝	50⅜		60.000.000	25	50cQ*	Sept. 30, 29	Prairie Oil & Gas	5,400	54	54	52⅛	53	—1
137½	122½	190	130¾	280	172	65	53⅝		$101.250.000	$25	75cQ*	Sept. 30, 29	Prairie Pipe	8,500	60½	60⅞	60	60¼	+ ¼
20¾	11	33⅞	16¾	29⅞	16	25⅞	11½		$37,450,850	$50	.....	Sept. 15, 23	Producers & Refiners	6,700	12⅝	14⅝	12	12	— ⅝
41¾	30¾	50	36⅞	49⅝	41	46¾	34		2,845.350	50	37½cQ	May 1, 25	Producers & Refiners pfd.	4,000	38¼	38¼	38	38	...
81	25¼	33½	25	31⅝	19	30¾	23¼		75.959.350	25	.....	Sept. 2, 29	Pure Oil Co.	19,500	26	26¼	25⅛	25⅜	— ⅝
27½	22	28⅝	25⅜	56	23	49⅝	38⅞		1,917.181	20	50cQ*	Aug. 15, 28	Richfield Oil	23,100	39⅜	40⅜	37⅜	39¼	—3¾
57⅜	47⅜	54½	44¼	64	44⅝	61½	49⅞	(sh)	611.303	13.40	.....	Aug. 13, 29	Royal Dutch, N. Y., sh. ..	123,500	58½	60⅜	56⅝	60⅜	+ 2
48⅝	40½	47⅞	41⅜	57½	40⅝	55¾	43⅜	(sh)	£30,000,000	£1	$1.45	July 23, 29	Shell Transport & T.	No sales.					
31	24	31¾	24⅝	39¼	23¼	31⅜	25	(sh)	20,000,000	N.P.	35cQ	Sept. 30, 29	Shell Union Oil	23,700	26½	27⅝	26	26⅛	— ⅛
25⅝	15⅛	25⅜	14¼	27¼	18⅛	40⅛	18⅛		$8.357,000	$10	40cQ	Sept. 14, 29	Simms Petroleum	11,500	30½	33¾	30⅛	33¼	+ 2¾
24⅞	15¾	22⅜	15	46¾	17⅜	45	31½	(sh)	4,501,915	N.P.	50cQ*	Oct. 15, 29	Sinclair Consolidated	110,200	34½	35	32¼	33½	— ¾
99½	90	104½	97	110	102½	111	107		$16,604,600	$100	$2Q	Aug. 15, 29	Sinclair Consolidated pfd.	No sales.					
87⅛	26⅝	37⅝	24⅛	42⅝	25	46½	32⅞		27.396.590	25	50cQ	Sept. 16, 29	Skelly Oil Co.	21,100	40¼	41¼	39	39¼	— ⅞
63⅝	51½	60¾	50⅜	80	53	81⅞	64	(sh)	12.594.098	N.P.	65½cQ	Sept. 16, 29	Standard Oil of Cal.	40,300	73⅝	75⅞	72½	73⅞	+ ⅞
46⅜	37½	41⅜	35⅛	59⅜	37¾	80½	48		$611.120,700	$25	25cQ*	Sept. 16, 29	Standard Oil of N. J. ...	48,600	74⅝	77⅞	72⅝	77⅝	+ 3⅜
47¼	30⅜	34⅛	29¾	44¼	28¾	48⅛	37⅝		427,973,275	25	40cQ	Sept. 16, 29	Standard Oil of N. Y.	115,600	43½	44½	41¼	43⅞	+ ¾
41¾	30⅛	34⅞	30	77	31½	83¾	57	(sh)	1,206,073	N.P.	25cQ	Sept. 16, 29	Sun Oil	1,100	..	79	73½	76½	...
..	..	..	..	..	..	24	17		2,400,000	N.P.	.....	Dec. 20, 20	Superior Oil Corp.	12,900	19⅜	19½	16½	18¼	—1½
58	48	58	45	74¾	50	71⅞	57¼		$211,076,650	$25	75cQ	Oct. 1, 29	The Texas Corporation ..	68,800	65¼	66¾	64	64⅞	— ¾
19½	12	18⅞	12	26⅝	12⅛	23⅞	15⅛		8,380,340	10	.....	Jan. 8, 28	Texas Pacific Coal & Oil .	11,400	15¾	15¾	14⅜	14⅞	— ⅛
39¼	27	29⅛	19	41½	19⅝	40	27⅛	(sh)	2.168.410	N.P.	20cQ	June 29, 29	Tide Water Oil Co.	21,500	33½	32	25⅛	26½	—3⅝
103	87¼	90⅛	85	100⅛	86	97½	90		$20,705,200	$100	65½cQ	Aug. 15, 29	Tide Wat. O. Co. 5% pfd.	500	97⅞	92	91⅝	92	— ¼
27	20⅞	19⅛	15¾	25	14¾	23½	17½	(sh)	4.796.158	N.P.	.....	Aug. 1, 27	Tide Water Associated ...	41,600	18½	18⅞	17	17¾	— ½
5½	3	10⅜	3¾	14¾	7¼	15¼	9	(sh)	3,742,029	N.P.	.....	.....	Transcontinental Oil	146,000	12⅝	13	11½	12	— ⅝
58⅜	37¼	56½	39⅝	58	42⅝	54½	45½		$94,798,100	$25	50cQ	Aug. 10, 29	Union Oil of California ..	36,500	54⅞	57	51¼	54	+ ⅜
120⅝	84¼	127½	94	128⅛	110	160	121⅞		31,061,200	100	$1.25Q	Sept. 3, 29	Union Tank Car Co.	200	158½	158½	152	152¼	—6½
30½	23½	34½	24½	44⅞	26	42⅞	28½	(sh)	356.000	N.P.	50cQ	July 2, 29	Warner Quinlan	14,600	28¾	29½	27¼	27⅞	— ⅝
29¾	25⅛	27½	20	38	20⅛	38	30¼	(sh)	490,000	N.P.	50cQ	July 20, 29	White Eagle Oil & Refg. .	10,400	34	34⅞	32½	34	...
..	..	..	..	..	..	29¾	17		.....	....	.....	.....	Wilcox Oil & Gas	1,200	17⅛	17⅛	16	17	— ¼

*Also extras. †Ex-dividend.

STANDARD OIL STOCKS ON NEW YORK CURB

														For week ended October 5: Sales	Open	High	Low	Last	Change
21	16	21⅝	17⅞	22⅜	14⅞	18	14¼		£4,126,460	£1	.....	June 6, 28	Anglo-American Oil	2,320	15⅜	15⅝	14¾	14⅞	...
....	....	3¾	¾	5	1¼	2½	1⅛	(sh)	500,000	N.P.	.....	.....	Atlantic Lobos	400	1	1¼	1	1¼	+ ⅛
76	65	69	50	56½	44½	46½	26		$1,000,000	25	$1S.A.*	Apr. 15, 29	Borne Scrymser	50	27	27	27	27	— ⅞
59½	42	60	45	76	53	74¼	58⅜		10,000,000	50	$1Q*	June 15, 29	Buckeye Pipe Line	100	67¼	67¼	67¼	67½	— ¼
82½	65	126	76½	161	117	210	140⅛		3,000,000	25	$1Q*	Sept. 30, 29	Chesebrough Mfg.	200	186	189¼	186	189¼	...
25⅞	17½	22⅝	16¼	23	16	29	16⅞		36,057,840	10	.....	Dec. 15, 27	Continental Oil	700	18¾	19	18⅜	19	— ⅜
137	102	137	89	114	67	95	60		1,500,000	50	$1Q*	Sept. 16, 29	Cumberland Pipe Line ..	50	60	60	60	60	...
63¾	43	68½	47	88	64⅛	70½	55½		5,000,000	100	$1Q	Aug. 1, 29	Eureka Pipe Line	50	57	57	57	57	+ 6½
32½	9⅞	13½	3½	13	4¼	6⅝	5		16,000,000	100	.....	June 30, 25	Galena Signal Oil	No sales.					
68½	52	68½	54	114¾	59¼	128	89⅝		73,117,577	25	30cQ*	July 1, 29	Humble Oil & Refining ...	8,500	115⅞	120⅝	114⅜	114⅞	—3
144½	125½	182	123¾	290½	176½	340½	285		20.000	100	10%S.A.	June 15, 29	Illinois Pipe Line	350	304	304	300	300	— ½
..	..	64¾	37¾	104	56¾	41	26⅝	(sh)	6,458,267	N.P.	12½c	Sept. 2, 29	Imperial of Canada	18,500	36¾	37½	34¾	34¾	—2⅛
72½	58	94½	61	91⅞	74⅝	28⅝	26¾		$5,000,000	$50	.....	Feb. 15, 29	Indiana Pipe Line (new).	800	29⅝	31⅜	29⅝	31¼	+ 1¾
35½	28¾	39	28¼	55	35	30⅜	22½	(sh)	7.123.144	N.P.	12½c	Sept. 25, 29	International Pet. (new) .	30,100	25½	27⅞	25	25	— ¾
20¾	12½	24	13½	32⅜	19⅜	25⅞	21⅛		$6,363,350	12.50	25c*	Sept. 16, 29	National Transit Co.	1,000	20¾	20⅞	19⅝	19⅝	—1⅜
51½	27¼	44½	31¼	75	38½	85	70		5,000.000	100	.....	July 15, 26	New York Transit	No sales.					
80½	64	100	70	69	56½	63	52¾		2.000,000	50	$2S.A.	July 1, 29	Northern Pipe Line	150	55¼	55¾	53½	53½	...
67¾	55¾	67⅞	52	84	58½	77⅞	64⅛		60,000,000	25	50cQ*	Sept. 14, 29	Ohio Oil Co.	4,700	77⅝	79¼	77⅝	78⅞	+ ⅞
24¾	15	39	12	84	28	44½	23⅛		10,000,000	25	75c	Dec. 15, 28	Penn Mex. Fuel	100	27	27	27	27	—3
....	....	....	....	....	....	50	37¾		.....	....	$1.25S	June 20, 29	Solar Refining (new)	100	37¾	37¾	37¾	37¾	+ 1¼
74½	61½	27¼	15½	19	15	22½	13		1,000,000	10	$10	Mar. 1, 29	Southern Pipe Line	800	21¾	21⅞	21	21⅞	+ ⅛
50	34½	41½	35	71⅞	36¾	69⅞	62		2,000,000	25	50cQ	Dec. 31, 28	South Penn Oil (old)	1,800	49	49	47	47	—2
....	....	....	....	....	....	60¼	40⅜		.....	....	.....	.....	South Penn Oil (new) ...	.....	..	..	..	..	
56	47½	83	55½	102	70	70	62¾		3.500.000	100	$1Q*	Oct. 1, 29	Southwest Pa. Pipe Lines.	1,600	54⅞	56	54⅞	56	...
70½	60½	81½	64⅝	95⅞	70⅞	63	51½	(sh)	18,000,000	25	62½c*	Sept. 16, 29	Standard Oil of Indiana ..	88,300	54	55	52⅝	53¾	— ¼
36½	16½	20⅞	14⅝	37¾	15	26	18		8,000,000	25	.....	June 16. 24	Standard Oil of Kansas ..	2,800	25½	25½	24	24	— ¾
134⅜	108	130	111½	179¾	122¼	45¼	35⅛		17,012.559	10	40c*	June 26, 29	Standard Oil of Kentucky.	32,500	41⅞	44¾	41	42	+ ⅛
51⅜	42	49½	40	54⅞	39⅞	50¼	45½		4,559,850	25	62½cQ*	Sept. 20, 29	Standard Oil of Nebraska.	100	48	48	48	48	+ ¾
372	288	87½	72	134	71	129	110¼		14,000,000	25	62½cQ	Oct. 1, 29	Standard Oil of Ohio	350	113½	115¼	112	112¼	+ 1¼
21	15	21	14½	23½	16	18	15		861,000	25	.....	Nov . 1, 19	Swan Finch Co.	No sales.					
109⅝	90¼	....	....	111	72	133¾	105½		125,619,000	25	75cQ*	Sept. 20, 29	Vacuum Oil Co.	5,900	120¾	123⅜	118	118	—2¼

*Also extras.

increase of 7,700,000 bbls. over 1928. Rumania is expected to continue its steady increase and, thanks to a more liberal petroleum law, has even better prospects for the future. Persia, besides increasing production in existing fields, added another proven oil area. There has been no production from these fields yet, but the shut-in production is reported to be in excess of the present yield. Minor producing countries, Mr. Garfias predicts, also will show substantial increases.

Mr. Garfias considers that the serious consideration of a more definite policy of oil conservation has been one of the most important developments of the year. The United States Government aided the conservation program considerably by stopping further permits to drill on government lands; California put into effect a gas conservation law, and the oil industry itself showed a marked tendency toward consolidation of its various branches into larger units. In many fields, among them Venezuela, mutual conservation agreements were entered into by the producers. Aside from progress toward conservation, the most notable event was probably the placing on a commercial basis of the refining experiment commonly known as the hydrogenation process.

ROCKY MOUNTAIN AREA

(Continued from Page 208)

with the 10-inch cemented on bottom. In the Oregon Basin Field, the Texas Production Co.'s No. 1 Sonners, NW cor. Section 29-51-100, is rigging up, and the Ohio Oil Co.'s No. 2 Sonners, Account 2, NE cor. Section 8-51-100, is drilling out cement at 3,595 feet, at which depth the 6⅝-inch was set. The Orchard Oil Co.'s No. 7 Rue, SW cor. NW Section 28-51-100, cemented to 6⅝-inch at 3,540 feet and is changing over to cable tools to drill in. The rotary rig is being moved to the same company's No. 1 Owens, SE cor. Section 29-52-100, which is standing with the 12½-inch cemented at 1,650 feet. The same company's No. 1 Atherly, SW cor. Section 33-52-100, is drilling at 1,765 feet and carrying the 10-inch The 12½-inch is at 1,635 feet.

Big Horn County

In Big Horn County, the Ohio Oil Co.'s No. 1 Union Gas, NE NE Section 22-53-97, Byron Dome, is drilling at 3,016 feet, and the Producers & Refiners Corp.'s No. 3, NW NW Section 24-56-98, Garland Dome, joint with the Kinney Coastal Oil Co., has recovered tools and is drilling at 4,214 feet in the Tensleep. It is making considerable gas and spraying some distillates.

In Hot Springs County, the Ohio Oil Co.'s No. 1 Smith, Section 9-46-99, Walker Dome, is spudding, and the Gebo Consolidated Oil Co.'s No. 1, SW cor. Section 23-44-95, Gebo Dome, is drilling at 1,310 feet. The Midwest Refining Co.'s No. 8, SE Section 6-44-98, Wagonhound, is drilling at 915 feet in black sand and showing water, and the Texas Production Co.'s No. 1 Skelton Dome, NW SW Section 23-45-100, is standing with the 8⅝-inch cemented on bottom at 3,710 feet.

In Weston County, in the northeastern part of the state, the Oregon-Wyoming Oil & Gas Co.'s No. 2, Section 24-46-64, Osage Field, has been completed at 1,600 feet with an initial production of 90 bbls. It settled to 45 bbls. This company is operating on Sections 24 and 25. Its No. 1 was cleaned out recently and responded with a production of 45 bbls. a day. Rig is being moved from No. 2 to location for No. 3. The Portland-Osage Oil Co., a sister organization, is operating adjacent property where it has two wells producing 35 bbls. a day. Hugh Updyke and others have completed a 25-bbl. well at 1,535 feet on Section 11-46-65.

The Kinney-Coastal Oil Co.'s No. 1 Dykeman, SE SW Section 22-3n-1w, a deep test on the Pilot Butte Dome in Fremont County, is showing up very favorably and gives strong indications of opening a producer within the next 100 feet in the Muddy sand. This well was shot recently at 3,317-40 feet to test a sandy shale horizon. It showed for 40 to 50 bbls. a day. The hole was then cored 27 feet deeper and the gas increased to more than 5,000,000 feet, spraying oil from the sandy shale above. Operations have been suspended to connect up flow lines, install a control head and move back the boiler before drilling into the Muddy sand. The Texas Production Co.'s No. 1-A State, SW SW Section 36-34-95, Alkali Butte Dome, is straightening crooked hole at 620 feet, and the Producers & Refiners' No. 9 Sand Draw, SW SW Section 15-22-95, is shut down for water at 2,200 feet.

Niobrara County

In Niobrara County, in eastern Wyoming, the Argo Oil Co.'s No. 7 Wehopeso, SW NW Section 19-38-60, a test to the Sundance in the Mule Creek Field, is drilling at 1,780 feet in the Morrison with water standing within 475 feet of the top, the water coming from 1,635 feet. The Ohio Oil Co.'s No. 2 Converse Sheep, SE SW Section 32-36-65, Lance Creek, a joint test being deepened to the Sundance, has cemented back from 3,238 feet to 2,840 feet to sidetrack tools.

In Carbon County, the Producers & Refiners' No. 2, SE NW Section 34-26-88, Mahoney Dome, is drilling in red sand at 3,035 feet, and its No. 3, Section 28-21-86, Grenville Dome, is drilling at 760 feet in hard sandy lime with the hole filling with water. The Midwest Refining Co.'s No. 31, SE Section 1-18-78, Dutton Creek, is drilling at 805 feet in gray shale.

In Sweetwater County, the Mountain Fuel Supply Co.'s No. 1 Newberry, SE cor. Section 13-12-100, Hiawatha Dome, has been completed at 2,347 feet and shut in after gauging 30,000,000 feet of gas. This is the well which caught fire two weeks ago and injured three men. It extended the proven area half a mile to the north. The gas will be held as a reserve for the new gas line into Utah. The same company's No. 1 Hay, NE cor. Section 26-17-104, South Baxter Basin, is drilling at 3,135 feet after cementing the 10-inch at 3,010 feet, and its No. 1 Union Pacific, Section 13-19-104, is rigging up. The same company's No. 1 Cappers, SW NE Section 2-19-104, North Baxter Basin, is drilling at 650 feet, and its No. 1 Murphy, NE NE Section 26-17-104, South Baxter Basin, is drilling at 3,140 feet. Its No. 1 Tucker, NW SE Section 18-13-99, Alkali Creek, which showed some gas and then ran unto sulphur water at 2,850 feet, is drilling deeper at 2,955 feet.

In Sublet County, the California Petroleum Co.'s No. 7-L, Section 34-27-113, La Barge Field, was completed at 872 feet as a 50-bbl. well. This completes the company's drilling program for the present. Joseph Minton and others' No. 1, Section 9-27-113, is resuming at 765 feet after being idle for the past year. The Midwest Refining Co. is reported preparing to enlarge its loading rack facilities at Opal, the terminal of the pipe line from La Barge, from 10 to 20 cars capacity. The oil is shipped to the Utah Oil Refining Co.'s plant at Salt Lake City which company is installing a new unit of Holmes-Manley stills.

In Uinta County, the California Co.'s No. 1 Union Pacific, NE NW Section 7-17-116, Muddy Creek Dome, is drilling at 4,365 feet in hard gray sandy lime.

In Lincoln County, the Midwest Refining Co.'s No. 1, SE Section 25-37-117, Little Grays River, is bottomed at 1,635 feet and cleaning out and underreaming to lower casing for a water shut-off.

IDAHO

Fred G. Ostland of Billings, Mont., who has the contract for drilling a well for the E. H. Dewey interests on the NE Section 32-14n-36, in Clark County, Idaho, has derrick up and expects to commence spudding this week in a 2,600-foot test to the Phosporia, or Embar, as it is known in Wyoming. The Grand Teton Oil Co.'s No. 1 Blevins, SW Section 33-5n-44, Horseshoe structure, Teton County, is bottomed at 1,250 feet in a white limey chalk believed to be the contact sediment between the Frontier and the Aspen (Mowry) shale and underreaming to set the 12½-inch on bottom. The California Co.'s No. 1 Sorensen, NW SW Section 33-3n-41, Meadow Creek, Bonneville County, is running core barrel at a total depth of 3,550 feet. Core did not show bedding plane.

MONTANA

A. E. Crumley brought in an exceptionally good well on the Jarrett lease in Section 28-35-2, Kevin Sunburst Field. The well swabbed 246 bbls. in 12 hours and, after being connected with the tanks, flowed at the rate of 25 bbls. an hour. Production is coming from the Ellis sand at 1,470 feet. This is the best completion in Kevin-Sunburst for some weeks. The California Co. brought in two small wells on the Smoke lease, No. 14 and No. 15, both Ellis sand producers. C. A. Remington completed a 25-bbl. well on the Anderson lease in Section 30-35-1 and the Ohio Oil Co. is testing No. 10 on the Bruins lease. The Ohio well will make a commercial producer. The Texas Pacific Coal & Oil Co.'s deep test on the state lease in the Kevin-Sunburst Field has been delayed by a crooked hole and is drilling at 1,200 feet. The Potlatch deep test is shut down and the Roxana (Advance) well on the Kitchen lease is cleaning out on top of lost tools.

The Monalta Oil Co.'s wildcat well, a half mile south of the Canadian border, is attracting attention since the completion of the Vanalta well less than a mile across the national boundary. The Monalta well is drilling below 2,000 feet, less than 500 feet above the level where oil and gas in commercial quantities were found in the Vanalta well. The Monalta well is checking higher than its Canadian neighbor.

Near Cut Bank

The Drumheller Yunck well near Cut Bank, which found oil several weeks ago in a stray sand below the Sunburst, was shot last week after plugging back from the Ellis, which carried water. According to reports, oil went over the top of the derrick for 10 minutes after the shot went off and the casing filled with oil. The well looks like a commercial producer, some estimates running as high as 50 bbls. No test has been made. There is some talk of giving the well a second shot before testing.

The Tip O'Neil well on the Black Horse Lake structure near Great Falls met with bad luck and the location was abandoned after two strings of tools and a bailer were lost in the hole at about 550 feet. The rig was skidded and another hole spudded. The U. S. Petroleum well on the same structure is still drilling without finding anything of value since the showing at 1,150 feet.

The Michiner interests are drilling at about 400 feet on the South Pondera structure near Power after losing the first hole at 450 feet. This is the second test drilled by the Michiner interests on this structure, the first having reported oil and gas showings at the top of the Bannatyne sand but afterwards having encountered water.

The Anaconda Petroleum Co. is down 2,000 feet on the Berthelote Dome, Section 19-36-2. The Anaconda found a 2,000,000-foot gas flow at 1,350 feet at this location. A mile south of the Anaconda test, the Black Gold Oil Co. has spudded on Section 30-36-2. The Roxana Drilling Co. is down 300 feet on the Toole structure in the same general locality, Section 22-36-1.

The Valier Williams Oil Co. spudded a test 5 miles southeast of the town of Valier and 13 miles north of the Pondera Field. The well is financed by farmers and business men of the Valier-Williams district, who hold about 30,000 acres in leases.

Rocky Mountain Fields

Daily average pipe line runs week ending October 5.

WYOMING	
Salt Creek	34,320
Frannie	30
Big Muddy	2,220
Oregon Basin	5,290
Byron	....
Dutton	30
Elk Basin	660
Ferris	20
Grass Creek	2,230
Greybull	10
Hamilton	1,000
La Barge	2,260
Lance Creek	190
Lost Soldier	3,470
Osage	870
Poison Spider	860
Rock River	2,290
Rex Lake	80
Lander	530
Simpson Ridge	120
Teapot Dome	40
Mule Creek	630
Pilot Butte	180
Total	57,280
MONTANA	
Cat Creek	1,330
Kevin-Sunburst	6,880
Pondera	2,680
Lake Basin	50
Total	10,940
COLORADO	
Moffat	1,227
Fort Collins	2,007
Florence	916
Iles	1,725
Tow Creek	361
Boulder	25
Rangely	100
Total	6,361
NEW MEXICO	
Artesia	842
Cap Rock (Maljamar)	415
Hogback	380
Rattlesnake	1,770
Table Mesa	119
Total	3,526
Grand total	78,107

CONSERVATION IN VENEZUELA DISCUSSED

(Continued from Page 56)

der Royal Dutch-Shell management, produced 7,659,817 bbls. during the first eight months of 1929, against 9,224,857 bbls. in the comparable months of 1928, or at the rate of 31,522 bbls. per day against 37,837 bbls. daily. General Asphalt Co. has a royalty interest in Caribbean Petroleum's output.

Imports Increasing

Peak output this year was attained in June, with a total of 12,100,959 bbls., a daily average of 403,365 bbls., produced. Peak for 1928 was in July, with aggregate production of 9,397,451 bbls., or 303,146 bbls. per day.

Notwithstanding that larger quantities of Venezuelan crude are being utilized close to the source of production through operation of Lago's new 125,000-bbl. refinery, imports of Venezuelan crude oil into the United States continue on the increase. During the first eight months this year a total of 36,851,000 bbls. were imported into the United States from Venezuela, against 30,358,000 bbls. in the corresponding months of 1928. This was more than 33⅓ per cent of the entire production of Venezuela, and showed a gain of approximately 20 per cent over the imports from Venezuela in the first eight months of 1928.

From the foregoing figures, it is evident that Venezuelan production of crude oil has an important bearing upon the situation in the United States, and the advantages which might accrue from a conservation program are obvious.

Gasoline Imports

The 1929 import figures on Venezuelan crude, however, do not tell the entire story. Venezuelan gasoline is now reaching the United States in increasingly large quantities, and these imports are having an important effect upon the market situation on the Atlantic Coast. Royal Dutch-Shell is now regularly shipping Venezuelan gasoline into East Coast states for distribution by Shell Eastern Petroleum Products and Lago is shipping gasoline from its new Aruba refinery for distribution in this area by Pan American, and in addition, one or two other companies are receiving gasoline from Curacao on contract.

With a large gasoline gallonage developed in the eastern United States, and every assurance of continued expansion in the marketing of motor fuel in this country, both Royal Dutch-Shell and Standard of Indiana are favorably situated for a conservation program in Venezuela.

The situation with the other American companies operating in Venezuela, however, is different. These companies are bringing practically all of their crude production to the East Coast area for refining, with some small shipments going to the Gulf Coast refineries. Conceivably, these companies are dependent upon cheap crude oil from Venezuela to meet the competition which imports of Venezuelan gasoline by Shell and Pan American affords. In addition, these companies have expended considerable sums in improving their refineries on the Atlantic Coast, installing expensive cracking equipment designed especially for handling South American crude oil. Whether or not the interests of these companies will permit them to join hands with Shell and Indiana in a conservation program is something which later developments must determine.

Effect in Mid-Continent

While competition from Venezuelan crude and gasoline is centering in the East Coast area, refiners and producers in the Mid-Continent are getting the "backwash" from this competition, and all indications are that South American oil will develop steadily as a competitive factor in the domestic picture, tending to crowd Group 3 still farther. Not only is this true of potential outlets for Mid-Continent gasoline, kerosene, and crude oils in the East Coast area, but it applies likewise to many of the interior markets now supplied from the Mid Continent.

California gasoline in years past, and at the present time as well, has penetrated far enough inland from the Atlantic seaboard to constitute a definite menace to Southwestern refiners on a number of occasions. With marketing plans contemplating a number of important re-

visions reported under consideration by large oil companies with headquarters in the East Coast area, it is evident that Group 3 refiners are to feel still more the "long arm" of eastern competition and that a number of markets normally drawing their supplies from Group 3, either in the form of gasoline and other products and crude as well, will be invaded by refined products from Atlantic seaboard refineries within the next few years. This widening competition is traceable directly to the influence of cheap South American crude oil in this country.

No Immediate Action

Considerable speculation is rife among eastern oil interests as to the possibility of a successful culmination of the efforts looking toward the inauguration of a conservation program in Venezuela. There is no possibility of any immediate action, it is felt, although it is believed there may be some concrete developments prior to the end of the year. Sir Henri Deterding is expected to attend this year's meeting of the American Petroleum Institute, and it is considered likely that after the Royal Dutch-Shell chairman has had an opportunity to further sound out conservation sentiment among American oil leaders that a concrete program for curtailment in Venezuela may be worked out, and derive the support of the principal companies operating in that country.

ANNUAL CONVENTION OF TEXAS MARKETERS

(Continued from Page 226)

John C. Calhoun, Corsicana; A. M. Hughes, Amarillo; George W. Carroll, Beaumont; John W. Choate, San Antonio; William Ellis, Hillsboro; Arthur Blum, Temple; J. W. Sandifer, Bryant; John McCoy, Fort Worth; G. W. Reid, Wichita Falls; George Buckner, San Angelo; L. O. Blocker, Breckenridge.

The first local Petroleum Board of Trade was organized in San Antonio and at the time of the convention it was the only one. Efforts are to be made at once to organize Petroleum Boards of Trade in El Paso, Dallas, Fort Worth and Houston and officers of the association brought out at the convention that ultimately the work of the association would be carried on largely through the local Petroleum Boards of Trade. In his speech accepting re election as president Mr. Russ paid tribute to John W. Choate, president of the San Antonio Petroleum Board of Trade, for the manner in which arrangements for the convention had been carried out.

Saturday the association received word from the American Petroleum Institute approving the plans of the Texas Petroleum Marketers Association for carrying into effect the Institute's code of ethics.

Under the new program and plans for the next 12 months the State of Texas is divided into 12 districts with a member of the board of directors in charge of each district and group meetings will be held in these districts frequently throughout the year. All of the officers are members of the board of directors but it is the 12 additional directors that have been added to the board to whom has been assigned the work in the 12 districts of the state. The four vice presidents will be assigned each one-quarter of the state and their duties will include attending the group meetings in the 12 districts and general supervision in the part of the state assigned to them.

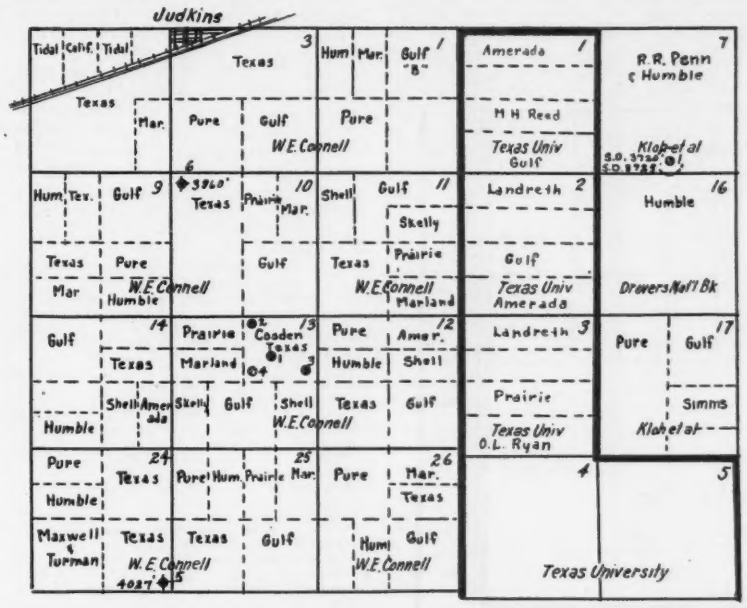
WEST TEXAS FIELDS

(Continued from Page 89)

for a test definite knowledge of the possibilities of the well and the new area can be obtained. The acreage surrounding this test is considerably cut up into smaller plots, consequently offset tests will no doubt be started as soon as the well is found to be a commercial producer. Other producers in the area will call for a pipe line, one possibly coming from one of the tank farms between Pyote or Monahans, or one of the large lines traversing Winkler and Ward Counties. The Atlantic Pipe Line Co. has a 4-inch line from the Shipley Pool to the loading rack and line at Pyote and is pumping oil from that point in Winkler County to Midland, where it is in turn pumped to Atreco through its 582-mile 10-inch line. It is possible that this 4-inch from the Shipley Pool may be extended to the new area, although the Shipley Pool can eventually run it to capacity, if not at the present time.

Another week will give much information as to this new well, and what the new area may mean in the way of commercial producers, consequently we will have to wait until storage can be moved in and set up for the testing of the well.

The Penn Oil Co. and Atlantic Oil Producing Co.'s No. 1 Pecos Mercantile Co. (Bennett) in Section 16, Block 34, NW of the Shipley Pool, was plugged back from total depth of 2,618 feet to 2,615 feet and shot with 210 quarts from 2,498-2,610 feet. It cleaned itself and flowed and swabbed 216 bbls. of oil the first 24 hours after shooting, while it had 200 feet of cavings in the hole. During the second 24 hours it flowed 185 bbls., while cleaning out. It is now almost cleaned out to the bottom. Top of the pay of this test is 2,348 feet, and it also is the opener of a new pool in Ward County, on a separate structure from that in the Shipley Pool.



Plat showing location of the Penn Oil Co. and Humble Oil & Refining Co.'s No. 1 Klob and others in the S half of Section 7, Block 44, T-3-S, T.&P. Survey, Ector County, near the town of Julkins. This well is evidently near the top of the structure from which The Texas Company and Cosden's No. 3 Connell wells are producing. This discovery shows up better than the best of any of those wells on its best gauge. Top of the pay in this test is 3,720 feet and total depth 3,725 feet. It made one head of oil estimated around 150 bbls. while swabbing.

Last week it was reported that E. A. Landreth had purchased the 40-car loading rack of the Continental Oil Co. at McCamey, and would run an 8-inch line from the Taylor-Link Pool to this loading rack, but now he is moving the rack 1 mile west in Section 62 and will increase it to 120 cars, and will also build twenty 80,000-bbl. tanks just north of Crossett instead of 10 as was reported last week. This week he also purchased a half interest in Section 26, Block 11, H.&G.N. Survey, west offset section to the Rowan & Tong and Independent Oil & Gas Co.'s well, from the Simms Oil Co. for a consideration of $400 000 cash, the Simms company to produce the lease. He also purchased 40 acres in the NE, Section 24, south of the Taylor-Link discovery well, from J. O. Anderson, thereby acquiring an interest in this quarter with the Taylor-Link Oil Co., which is to operate with Landreth on a fifty-fifty basis.

Girvin Pool

Several square miles northwest of the Girvin Pool are now coming in for a play, there being eight tests now moving in or drilling. Zoch and others are to drill in the C SW, Section 81, Cordova Union Land Co., Moncrief and others are drilling in the SW, Section 58, and one test in the SE cor. NW, Section 84, Corzelius is to drill in the C SE NW, Section 29, and Dittman in the NW, Section 34. E. A. Landreth and the Shell Petroleum Corp. are to drill in the SE cor., Section 31, the Condor Petroleum Corp. is to drill in the NW cor., Section 52, and the Anna Bell Oil Co. in the NW, Section 32. All these tests are to be in Block 11, H.&G.N. Survey. There is one dry hole in the NW, Section 114, drilled by "Cowboy" Evans, and another drilled by the Continental Oil Co. in the SW cor., Section 90. This test went to 2,355 feet, whereas the former went to 1,340 feet only.

This is an exceedingly active territory and will be closely watched by scouts from all the companies and operators operating in the Girvin Pool and Taylor-

Rowan and Tong Area

The Tidal Oil Co.'s No. 1 McDonald, a southwest offset of the Independent Oil & Gas Co. and Rowan & Tong's discovery in Pecos County, is now drilling plug, lacking but a few feet of the pay level in this pool. This is the second well in this area to be drilled, consequently many are watching to see whether it will bolster up this new pool, or help to depreciate it. The discovery well did not show up so good after 2-inch tubing was run, consequently tubing is being pulled to rerun and the well to be put on pump. It made only 2 bbls. per hour after the tubing was run, quite a small amount compared to its initial production of 340 bbls. the first two hours and 40 minutes. During the week, before tubing was run, the well was deepened from a total depth of 1,605 feet to 1,612 feet but with no increase in oil or water, another rather discouraging feature for the area.

REFINERS REDUCED RUNS DURING OCTOBER

(Continued from Page 58)

REFINERY OPERATIONS IN NORTH LOUISIANA
(Plants which have been in operation during the past year)

Name and address—	Daily capacity	Runs Oct. 1	Runs Sept. 1
Bayou State Refining Co., Houston	700	500	600
Crystal Oil Refining Corp., Shreveport	14,000	6,000	6,000
Dixie Oil Co., Superior	3,000	3,300	3,000
Louisiana Oil Refining Co., Shreveport, Bossier	24,000	12,600	16,000
Shreveport El Dorado Pipe Line Co., Shreveport	10,000	9,000	8,500
The Texas Company, Shreveport	7,000	6,000	6,000
Total	58,700	37,400	40,100

REFINERY OPERATIONS IN WEST TEXAS
(Plants which have been in operation during the past year)

Name and address—	Daily capacity	Runs Oct. 1	Runs Sept. 1
Amarillo Producers & Refiners Corp., Pyote	3,000	(*)	(*)
Big Spring Refining Co., Big Spring	2,500	1,900	2,100
Bluebonnet Oil Refining Co., Wickett	5,000	3,000	2,500
Burford Oil Co., Pecos City	6,000	5,000	5,000
Central Texas Refining Co., Brownwood	2,000	700	700
Central Texas Refining Co., Luling	2,500	2,400	(*)
Col-Tex Refining Co., Colorado	10,000	7,000	7,000
Cosden Co., Inc., Big Spring	15,000	5,800	7 1 0
Del Rio Refining Co., Del Rio	3,000	2,500	1,800
Grayburg Oil Co., San Antonio	6,000	3,000	2,500
Great Western Refining Co., Big Spring	8,500	3,500	3,600
Gulf Oil & Refining Co., Sweetwater	5,000	4,000	(*)
Humble Oil & Refining Co., San Antonio	5,000	4,000	4,500
Humble Oil & Refining Co., McCamey	15,000	8,000	10,000
Misko Refineries, Inc., Laredo	1,500	500	500
Mid-Tex Refining Co., Midland	2,500	1,700	1,500
Pasotex Petroleum Co., El Paso	10,000	5,500	5,000
Pecos Valley Refining Co., Pyote	8,500	(*)	(*)
Pioneer Oil & Refining Co., Somerset	1,500	1,500	1,000
Richardson Refining Co., Big Spring	6,000	3,000	4,800
Rio Grande Oil Co., El Paso	6,000	3,000	2,200
San Angelo Refining Co., San Angelo	2,000	500	500
Sweetwater Oil & Refining Co., Sweetwater	2,000	300	250
The Texas Company, San Antonio	3,000	2,500	2,500
The Texas Company, El Paso	1,500	1,000	1,500
Tonkawa Petroleum Co., Pyote	5,000	1,000	900
Texas Mexican Oil & Refining Co., Laredo	1,000	200	200
Texas Petroleum Products Co., Somerset	1 5 0	8 0	100
Wickett Refining Co., Wickett	2,500	†190	500
Total	143,000	72,480	68,650

*Shut down. †Will also run 700 bbls. tops daily.

REFINERY OPERATIONS IN ARKANSAS
(Plants which have been in operation during the past year)

Name and address—	Daily capacity	Runs Oct. 1	Runs Sept. 1
James R. Berry & Sons Co., Waterloo	2,000	750	500
Henry H. Cross Co., Smackover	6,000	5,300	5,600
Houston Oil Co., Camden	3,000	(*)	3,000
Kettle Creek Refining Co., Pearson	5,000	2 500	3 000
Lion Oil & Refining Co., El Dorado	12,000	9,500	8,000
Macmillan Petroleum Products Co., El Dorado	1,800	1,500	1,550
Ouachita Valley Refining Co., El Dorado	2,000	1,000	1,000
Root Refining Co., El Dorado	10,000	8,300	7,000
Simms Oil Co., Smackover	2 000	2 000	2 700
Total	44,800	31,450	3_,3_0

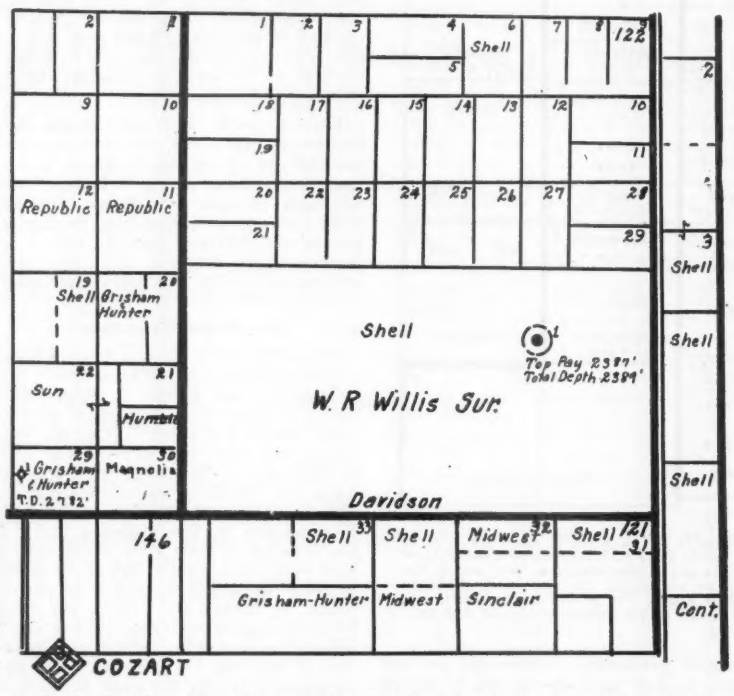
Link Pool, or anywhere in this part of Pecos County.

Pecos County University Lands

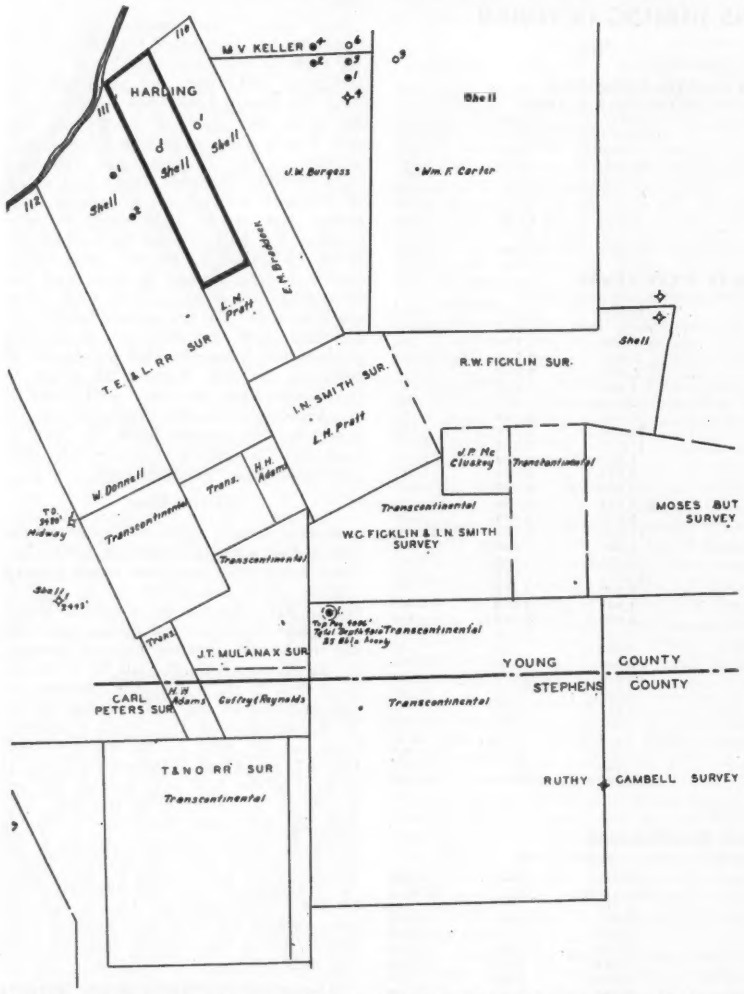
Purchases from the board of regents on University lands in Pecos County are as follows: California Co., NW SW, Section 13, Block 18, for $20,000, and the SE NW, Section 24, Block 18, for $16,000. M. H. Reed purchased the N half NE, Section 7, Block 17, for $1,080, and the S half NE, Section 7, for the same amount. Rentals on this land are not to be less than $1 per acre, the State retaining one-sixth royalty.

As a whole, bids for University lands in Crane, Ector and Pecos County, submitted at sale on October 1, were rather low, and no doubt many will be rejected, the board of regents having that right. The leases are to be for three years, instead of the regular 5 and 10-year lease generally acquired from individual fee owners.

It appears at present as if more oil in West Texas was to be disputed by the State. This time it is the famous "vacancy strip" in Crane County now owned by The Texas Company, which has produced around 6,500,000 bbls. of oil from 16 wells. It is 3.7 miles long, 400 feet wide and contains 182.8 acres. Cowden and Anderson originally obtained the lease on this land from the State as public school land, but the regents now claim the land originally belonged to the University and was not vacant public school land. The Texas Company acquired the strip from E. A. Landreth in June, 1928.



Plat showing location of Dunnigan and Shell Petroleum Corp.'s No. 1 Davidson, 4½ miles southwest of Tye in Taylor County. This test bids fair to open the first oil field in Taylor County, producing sweet oil from the Cook sand. The Shell Petroleum Corp. owns the majority of the acreage surrounding the test, the subdivisions in the north half of the W. R. Willis Survey being owned by many different operators and companies.



Plat showing the location of Transcontinental Oil Co.'s No. 1 Corbett in the Ruthy Cambell Survey, a 2-mile southern extension to the South Bend Pool in southern Young County, near the town of Harding. Top 4,006 feet, present total depth 4,010 feet. Came in with an initial production of 25 bbls. hourly.

PIPE LINE RUNS
September 18 to 25, 1929

Runs Through Trunk Lines	Last period
Atlantic P. L. Co., Port Arthur, Tex.	38,500
Gulf P. L. Co., to coast via Ranger, Tex.	29,169
Humble P. L. Co., Comyn, Tex.	27,510
Humble P. L. Co., Ingleside, Tex.	36,306
Illinois P. L. Co., via Del Rio, Tex.	37,322
Magnolia P. L. Co., DeLeon, Tex.	25,090
Pasotex P. L. Co., El Paso, Tex.	8,804
Shell P. L. Co., Healdton, Okla.	40,354
Shell P. L. Co., Houston, Tex.	24,268
The Texas Company, Houston, Tex.	24,681
Total	292,004
Tank Car Shipments	
Thomas & Brann, Grant City	170
Orient Co., McCamey, Tex.	110
American Pet. Co., Pyote, Tex.	4,544
Southern Crude O. P. Co., Wickett, Tex.	12,225
Total	17,049
Runs to West Texas Refineries	
Amarillo Prod. Co., Pyote, Tex.	off
Bluebonnett Ref. Co., Wickett, Tex.	4,553
Burford Ref. Co., Pecos, Tex.	2,914
Col-Tex Ref. Co., Colorado, Tex.	7,000
Cosden Ref. Co., Big Spring, Tex.	7,381
Great Western Ref. Co., Big Spring, Tex.	3,782
Humble O. & R. Co., McCamey, Tex.	11,037
Mid-Tex Ref. Co., Midland, Tex.	2,262
Tonkawa Ref. Co., Pyote, Tex.	off
Big Spring Ref. Co., Big Spring, Tex.	2,048
Richardson Ref. Co., Big Spring, Tex.	2,084
Wickett Ref. Co., Pyote, Tex.	188
Total	43,249

Summary	Previous week	Last period
Pipe line runs through trunk lines	313,138	292,004
Tank car shipments	17,990	17,049
Runs to West Texas refineries	42,122	43,249
Total daily distribution	372,250	352,302
Total daily production	362,971	368,307
Daily average from storage	9,279	16,005

Howard-Glasscock

Howard and Glasscock County's potential is up slightly for the period from October 1 to 30, now running 44,966 bbls. compared with 43,441 bbls. of the previous period, a gain of 1,525 bbls. There are 129 producing wells in the three different pay horizons, 74 from the 3,000-foot pay, 22 unable to make more than 200 bbls. per day and given full allowance; 23 producers from the 2,500-foot pay horizon, 10 on full allowance; 32 wells producing from the 2,200-foot pay, only 9 being prorated. The 3,000-foot horizon dropped from 27,321 bbls. to 23,672 bbls., a decrease of 3,649 bbls. The 2,500-foot pay horizon had a slight gain of 25 bbls. from 3,565 bbls. to 3,990 bbls., and the 2,200-foot pay or western extension gained 4,749 bbls. for the new period. This jumped from 12,555 to 17,304 bbls. The new wells in the Kirby extension were the main cause of this.

The new allowance of the field is 34,573 bbls., the 3,000-foot pay given 18,112 bbls., the 2,500-foot pay given 3,183 bbls., and the 2,200-foot pay given 13,278 bbls.

Yates Prorated

The new potential of the Yates Pool in Pecos County, on 12-hour gauges was 2,555,094 bbls., or 5,110,188 bbls. for 24-hour periods, an increase of 69,984 bbls. on 12-hour gauge. The former 12-hour gauge showed a potential of 2,485,110 bbls. This large gain was due principally to Mid-Kansas Oil & Gas Co. and Transcontinental Oil Co.'s No. 30-A Yates completed as the largest well in the field, making 141.33 bbls. per minute on a 34-minute test.

A new peak was set in oil production during the week in the Continental Oil Co.'s (Texon Oil & Land Co.'s) No. 1-B University, in the Big Lake Pool, Reagan County. It gauged 2,892.5 bbls. of oil and 25,551,000 feet of gas on October 2, averaging 2,800 bbls. for the week from September 28 to October 4, or a total of 19,602.5 bbls. for the week.

Late Fields

(Continued from Page 64)

in 15 hours. This well extends the producing area one-fourth mile north.

The gauges of the East Little River Pool for October 8 at 7 a. m. were as follows:

Company, farm—	Wells	Bbls.
Continental-Shaffer, Harrison	3	1,560
Gypsy, Payne	6	4,620
Gypsy, Walker	1	1,102
Mid-Continent, Smith	11	9,355
Prairie, Lustey	1	20
Prairie B. Smith	1	1,870
Prairie, Thomas	2	1,310
Prairie, Carr	1	....
Sinclair, Phillips	5	5,935
Texas, Chilcoat	1	965
Total	32	26,737

The new potential gauges of the East Earlsboro Pool were taken October 5. The total amount of oil produced was 50,529 bbls. from 31 wells. The gauges by companies and leases were as follows, also the gauge of October 8:

Company, farm—	Oct. 5	Oct. 8
Amerada, Sullivan	3,810	1,535
Barnsdall, Noble	867	35
Burke-Greis, Fixico	2,390	1,200
Carter, Wrightsman	7,515	3,930
Gypsy, Noble	3,690	1,737
Gypsy, Payne	9,599	4,225
Magnolia, A. Anderson	6,268	3,784
Magnolia, D. W. Anderson	3,718	1,762
Minnehoma, Noe	4,722	2,159
Prairie, Calkins	3,650	1,235
Prairie, Raitman	3,480	1,655
Prairie, Wisener	820	410
Total	50,529	23,667

Prairie Oil & Gas Co.'s No. 1 Smith, NE cor. SW, Section 5-7-7, Seminole County, had Wilcox sand at 4,213-28 feet. It flowed 550 bbls. October 6 and 1,055 bbls. October 7.

MICHIGAN

MUSKEGON, Mich., Oct. 8.—Average daily production of three Michigan fields showed a slight general increase for the week ending at 7 a. m. Monday, October 7, over totals for the previous week ending September 30. The aggregate increase was 397 bbls. from a total daily average of 17,389 to 17,786 bbls. Although the greatest increase was recorded in Dundee production of the Mount Pleasant Field of central Michigan, Dundee production of the Muskegon Field also showed an increase of 100 bbls. daily.

Muskegon average daily production was 10,000 bbls. of Dundee crude and 706 bbls. of Traverse. Mount Pleasant production was 6,800 bbls. of Dundee and 40 bbls. of Traverse. Saginow produced 240 bbls. daily of Traverse crude. Additional completions in the Dundee formation increased Mount Pleasant daily production by 300 bbls.

WEST TEXAS

FORT WORTH, Tex., Oct. 8.—In Pecos County Landreth & World Oil Co.'s No. 2 University, northeast quarter, Section 13, Block 18, had show of gas at 1,165 feet an increase at 1,320 feet and a blowout at 1,340 feet, estimated 14,000,000 feet. It is now drilling at 1,400 feet. Their No. 3, same quarter and section, shut in at 910 feet to kill gas and deepen, is estimated 40,000,000 feet at that depth. M. M. Rowan's No. 1 University, northeast, Section 25, Block 16, is drilling at 1,990 feet with show of gas.

In Young County La Long and others' No. 1 Williams, R. O. Woolford Survey No. 15, topped oil sand at 2,385 feet; total depth 2,385½ feet, is flowing 11 bbls. hourly. It extends production 3,000 feet north of Sinclair's Moran lease south of Kissinger Pool.

Dunnigan and Shell Corp.'s No. 1 Davidson, south half of Willis Survey, Taylor County, is heading every 15 minutes. Casing is about run to bottom; test will follow.

Engineers and Field Men Hear Papers

Meeting of Mid-Continent District, American Petroleum Institute Division of Development and Production Engineering

By L. G. E. Bignell

With the opening of the International Petroleum Exposition in Tulsa on October 5, and the gathering together of the oil men from all parts of this country and abroad the Division of Development and Production Engineering of the American Petroleum Institute found an excellent opportunity for having their fall meeting for the Mid-Continent district. This meeting consisted of a two-day session that beban Monday morning and extended through Tuesday.

At the morning session Monday H. C. Otis, superintendent of production, Arkansas Natural Gas Corp., reread by request his paper on "Methods of Tubing High Pressure Wells" which he had presented before the fall meeting of the A.I.M.E. Petroleum Division, published last week in The Oil and Gas Journal.

In the afternoon session Monday at which E. O. Bennett presided the feature was the group paper on "Repressuring Practice in the Mid-Continent," by D. L. Trax, consulting engineer, Gypsy Oil Co., Tulsa.

Tuesday morning's session, at which W. K. Whiteford was chairman, was devoted to a paper by C. L. Shirley, mechanical engineer, Shell Petroleum Corp., Tulsa, on "Comparative Operating Costs of Prime Movers in Drilling Wells." There was also a display and description of A.P.I. gauges by Spencer B. Terry of Pratt & Whitney Co., Hartford, Conn., who explained the function and application of gauges to oil country material and demonstrated the fit of gauges with products used in the field.

Welcomed by President Skelly

The address of welcome was made by William G. Skelly, president of the International Petroleum Exposition, in which he dwelt upon the growth of the industry since his entering into it many years ago when a string of casing weighed about 8 tons and he compared this with the present strings in the deep wells that weigh a total of around 225 tons. With the increase in the depth of the wells the problems to be dealt with in drilling and producing them have become matters for the attention of the engineers and he welcomed the men gathered at this meeting to the exposition and Tulsa and expressed a keen interest in their work.

The engineer, he said, is today relied upon to advise with the executive and his counsel is followed because it has been found that his mode of thought best suits him to work out the many mechanical problems that are being encountered by the industry and Mr. Skelly said that these conditions would continue and grow as the industry expands.

In the course of his remarks Mr. Skelly touched upon the air derby held in connection with the exposition and here again he pointed out how the engineers had made flying possible and how the utilization of the airplane for travel in the oil fields is becoming more and more important. The fact that this air derby will gather together some 200 fliers from all parts of the country together with many technicians and engineers indicates the very important part it is now playing in the oil industry today.

In closing Mr. Skelly introduced J. Edgar Pew, president of the Sun Oil Co., of Dallas, whose address is published on page 93 of this issue of The Oil and Gas Journal.

President Reeser Speaks

At the close of Mr. Pew's speech, which was well received by the audience, E. B. Reeser, president of the American Petroleum Institute, was introduced and he stated that the industry's chief executives fully realized the important part the engineers were playing in its progress and that the executives and others were coming more and more to rely upon their judgment in matters having to do with the companies' activities.

Mr. Reeser pointed to Mr. Pew as one of the pacemakers in the work of standardization of oil field equipment and stated that he considered this work is now recognized as a success and putting into use the many standardized articles needed by the industry is saving large sums of money each year.

But the keynote now is conservation, in Mr. Reeser's estimation, and the future efforts of the engineers must be turned in that direction if the best interests of the industry and nation are to be served.

A short time ago, he said, there was a fear expressed that there would be a shortage of oil, and the engineer and geologist were employed to find and produce this product and their work has been so well done that there is now an overproduction of this valuable material, so he did not know whether to commend or criticize the engineer in this instance, and therefore suggested that it will now be the engineer's problem to remedy this condition by applying his efforts to solving it.

The unitization plan for drilling and production of oil is accomplishing much, Mr. Reeser said, and must be carried further. The old practice of permitting executives to spot wells solely with regard to the neighboring operations and drilling only with the idea of getting to the producing sand first is wrong and it is up to the technical men within the industry to correct it and point the way to true conservation.

The unit control plan is now being operated in 25 or 30 pools and in most of them it has been put into effect within the past year so it is no longer merely a theory but a working condition and, Mr. Reeser said, it warrants the study of all engineering branches of the industry to secure improvement in the details of its operation and expansion of the practice until the competitive drilling abuse is a thing of the past.

Urges Engineers to Advise

Mr. Reeser said he did not think that the engineer should wait to be asked for his recommendations in these matters but he should propose them to the executives of his own initiative and meetings such as this one are bringing together the engineers and giving them the opportunity for discussion of the problems and arriving at sound methods of procedure. These meetings have the approval of the heads of the companies employing the engineers and the results being obtained are most gratifying.

Mr. Reeser closed by making reference to his other speech delivered before the American Institute of Mining and Metallurgical Engineers and appearing in this issue of The Oil and Gas Journal on page 152.

Following Mr. Reeser, John R. Suman, national chairman of the American Petroleum Institute Division of Development and Production Engineering, made a brief talk welcoming the members and their guests to the meeting and expressing his satisfaction at the progress being made.

The meeting then took up the papers prepared for its consideration with J. R. McWilliams presiding. All speakers were given careful attention while presenting their papers and a good discussion followed each and real progress is being made toward gathering some very valuable data for the Chicago meeting of the American Petroleum Institute in December when complete reports of all committees will be rendered.

There were about 150 men present at these meetings held in the new auditorium at the exposition grounds, where it is planned to hold other meetings of a like nature at each of the future oil shows as this gives the field man an opportunity to attend both the meetings and the exposition where he can hear the technical matters discussed as well as see the machinery displayed that will assist him in putting into actual practical use the things advocated.

OIL SHOW DEMONSTRATES PROGRESS INDUSTRY HAS MADE SAYS PAREDES

"The International Petroleum Exposition in this wonderful and beautiful city of Tulsa is in my mind the clearest demonstration of the great progress achieved by the oil industry in the last few years," said Sr. Ing. Trinidad Paredes, head of the Petroleum Bureau of the Mexican government and, with John A. Silsbee, petroleum engineer and geologist of Tulsa, representing officially the Associacion de Geofisico en Mexico. Doctor Paredes is a professor in the University of Mexico and is a member of the A.I.M.E., taking part in the meetings of the institute held in connection with the exposition.

"This progress in the oil industry," Doctor Paredes continued, "is most intimately related with your great country, since it has made oil a prime necessity in actual life.

"In all the world there is much to be learned from this exposition and we who come here with the desire of profiting from the many things it teaches, accepting at the same time the friendly reception which your city has accorded us, feel that truly our time spent here has been many times more profitable than we could possibly have anticipated.

Greatest Oil Show

"I have attended this exposition before and therefore feel I am qualified to state that this year's exhibit is undoubtedly the most notable and that it better attains the results desired than any of the past.

"The use of modern machinery assures utmost economy in operation. Therefore it goes without saying that this exposition will be the direct cause of millions of dollars worth of new business. Specialists in all branches of the oil industry display their newest inventions and because of this the advancement of the industry is much more rapid.

"Utmost in my mind is the problem of conservation. I consider American overproduction of oil a world problem, which will be much more complex when the large production obtainable from the oil fields of Russia, Irak, etc., is thrown on the market. I do not doubt but what in the near future an entity of great moral and material power will be organized for the protection of the oil industry, and that this entity will act to conserve the great resources of the subsoil, not only for the men of today but also for future generations.

Same Legal Principles Exist

"It has been suggested by some persons that in Mexico the decrease in production is a direct cause of our present oil laws. This is not so. At present a problem of most vital importance is discussed in this country regarding the oil industry, that will have to be solved in the near future. The same basic principles of oil law exist in Mexico as in the United States and all other nations concerned. When this problem is solved in the United States, our laws will automatically have been justified.

"The decrease in our production is caused by several facts which are purely industrial, but the potentiality of oil recoverable from Mexican oil-bearing formations is proven by oil wells such as 'Potrero del Llano,' one well that up to date has produced more than 116,000,000 bbls. of oil and is still flowing naturally, as is another well, known as 'Cerro Azul,' which has produced more than 81,000,000 bbls.

Senor Trinidad Paredes

"It is my wish to repeat at this time, to the officials of this great oil exposition, my gratitude for their most gracious kindness to my country and myself. Most especially do I wish to extend my sincere thanks to those individuals who have so tirelessly favored me with constant consideration both socially and otherwise. I feel I have been highly honored upon my present stay in Tulsa and I shall look forward to coming again."

SHREVEPORT GEOLOGISTS PLAN FOR NEW ORLEANS

SHREVEPORT, La., Oct. 7.—Preliminaries for the annual meeting of the American Association of Petroleum Geologists at New Orleans, March 20-22, inclusive next year were taken up by the Shreveport Geological Society at the annual meeting. M. W. Grimm, district geologist for the Tidal Oil Co. here, was elected president of the local society, C. M. Dorchester, of the Gulf Refining Co., vice president, and W. F. Chisholm, director of the minerals division of the Louisiana Conservation Department, secretary-treasurer.

Papers to be presented during the sessions at New Orleans will cover past developments and an attempt to forecast the future in Louisiana, Arkansas, Mississippi, Alabama and West Tennessee from past studies and well logs, particularly in Mississippi, southwestern Alabama, Arkansas, north of the Arkansas River and the new salt dome country

of coastal Louisiana. A field trip to the dome country during the sessions and another to Havana after the convention are two major items on the entertainment program which also includes a trip through the Bayou Teche "Evangeline" country and excursions up the Ol' Mississippi.'

PRODUCERS VOTE TO STABILIZE PRODUCTION

(Continued from Page 61)

fields have no gas pressure problems or gusher wells. They can produce as much or as little oil as needs require without damaging their properties and it is expected that this is what they will do.

New Mexico operators took the conservation problem in hand in the past week and it is expected that the Lea County Field will not be permitted to produce oil for which there is no current need. This may be accomplished by drilling wells to the top of the sand and not completing them unless lease requirements force a completion.

The 50 per cent curtailment of the big pools in Sedgwick County was put into effect on Saturday, October 5, and will continue for 30 days at least.

OPERATING COSTS OF PRIME MOVERS

(Continued from Page 62)

per foot. For "B", $1.38 per foot. As "B" was drilled to less depth, in less time and at a later period, the cost analysis per foot was questioned. Subsequent examinations of the gas statements indicated an error in posting the figures used for cost analysis. Corrected cost for "B" was $1.23 per foot.

Consistent study of data collected from various reliable sources indicated that the following hypothesis could be stated as a fact. The arithmetic mean of the average operating costs of the wells drilled in the Greater Seminole area, approximates the median of these costs. Differently stated, the cost of drilling a well may be expected to be equal to the average cost of previously drilled wells.

Wells drilled under conditions similar to those drilled at Seminole may be expected to cost an equal amount.

The statement may be established as follows: "Similar wells drilled under similar conditions will have equal costs."

From the foregoing statement, it may be correctly assumed that the equipment used to drill wells in the Mid-Continent has become standardized. In general, this is true insofar as the ability of the equipment to work is concerned. The parts of one steam drilling engine may not be used as replacement parts for an engine of another manufacturer, but almost any good standard type drilling engine would replace another, insofar as to its ability to do work.

It is very probable that the introduction of the piston valve in the steam end of the duplex slush pump saved a portion of the steam lost through more rapid radiation at higher working pressures. The economic value and reliability of a long-stroke slush pump has become an accepted fact.

Rotary Drilling

Within the last 12 months rotary drilling has displaced standard tools in Kansas, a territory heretofore regarded as exclusively cable tool territory. If the deep sands of the Appalachian foothills are to be exploited, the writer believes that it will be accomplished, at least in part, by the rotary method of drilling.

Because of the prevalent mode of rotary drilling now in force, the greater portion of the data used in preparing this paper pertains to rotary drilling.

Types of prime movers are as follows:

(1) Standard Cable Tool Prime Movers

(A) Steam engine and boiler.
- (aa) Gas fired.
- (ab) Oil fired.
- (ac) Coal fired.

(B) Internal combustion engine.
- (aa) Oil field type 2-cycle gas engine.
- (ab) Oil field type 2-cycle oil engine.
- (ac) Slow speed multicylinder gas engine.
- (ad) High speed multicylinder gas engine.
- (ae) High speed multicylinder gasoline engine.
- (af) Two-cycle Diesel engine.
- (ag) Four-cycle high speed Diesel engine.

(C) Electric motor (power from central station).
- (a) Double wound variable speed induction motor.
- (b) Variable speed induction motor.

(D) Electric motors (power from individual generating unit at well) motors as at (C).

(2) Rotary Tool Prime Movers

(A) Steam engine and boilers.
- (aa) Single cylinder engine and low-pressure boiler.
- (a1) Gas fired.
- (a2) Oil fired.
- (a3) Coal fired.
- (ab) Twin cylinder engine and high-pressure boiler.
- (a1) Gas fired.
- (a2). Oil fired.
- (a3) Coal fired.
- (ac) Multicylinder steam engine and gear box.

Note For "A"—Direct action duplex steam slush pumps used.

(B) Internal combustion engines.
- (aa) Oil field type 2-cycle oil engine.
- (ab) High speed multicylinder gas engine.
- (ac) High seed multicylinder gasoline engine.
- (ad) Two-cycle Diesel engine.
- (ae) Four-cycle high speed Diesel engine.

(C) Electric motor (power from central station).

For drawworks:
- (aa) Variable speed induction motor.
- (a1) Direct connected.
- (a2) With differential drive.
- (ab) Double wound variable speed induction motor.
- (a1) With differential drive using two motors.

For pump:
- (aa) Variable speed induction motor.
- (a1) With multiple rope reduction drive.
- (a2) With reduction gear drive.
- (a3) With reduction through two-speed gear box.

For drawworks and pump:
- Hydraulic "B" motors from "A" unit.
- (The above can be used with any type power.)

(D) Electric motor (power from individual generating unit at well).

Note—Motors as at (C).

Standard Cable Tools

Refer to Chart No. 1, "Average fuel costs for cable tool drilled wells." In discussion of this chart, it will be noted that the cost per foot for fuel using steam equipment is about 70 cents per foot. Under more rapid drilling and favorable conditions in the Mid-Continent cable tool wells, fuel cost should be less than 50 cents per foot.

Depreciation on cable tool prime movers used under normal conditions should be calculated at not less than 2 per cent per month.

The lower cost shown by the electric installations is possible, due to the more favorable drilling conditions.

The high cost of the two steam rigs using oil fuel, was due to the fact that they were wildcat wells. The two wells using Waukesha motors and gas fuel are typical of the fuel performance of high class automotive type industrial engines. The fuel cost of the one engine is authentic. This gas was metered and very careful records kept on this well. This is an unusual case and not typical of present expected performance. The maintenance cost of this class of engines is very high. This class of equipment gives excellent performance for rank wildcats where fuel is difficult to obtain. Note the results of the gasoline powered engine.

Equipment of this class using gasoline fuel and a closed cooling system was used by the writer in Kansas during the first part of 1929. Severe weather froze water systems throughout the state, causing a complete tie-up of drilling operations. This rig alone operated without engine trouble during this cold peroid. A small drum of glycerin was put in the radiator when the well was rigged up and this was the total of cooling medium used during the drilling operations.

The eight electric drilled wells used 20-50 horsepower drilling motors. They used 15.18 k.w.h. current in comparison to the 13.90 k.w.h. current used by 75 horsepower single rated motor. The individual case noted was by a contractor's 75 horsepower motor using an O. C. S. 85-E Universal rig front. The performance of this rig is typical of this class of equipment.

The attention of the writer was called to the record of a 40 horsepower Weber semi-Diesel engine which drilled 18 wells in the Bradford, Pa., Field.

Total Depth	Cost of Oil	Cost of fuel—per foot
26,669 feet	$915.10	$ .0346

Although conditions in the Bradford Field are not entirely similar to the present Mid-Continent conditions, this is an unusual record. The average depth was about 1,480 feet.

The report on Desel engines is not given. A high-speed four-cycle Diesel has been rigged up and reported running in Arkansas. One Diesel engine, two-cycle type, has been used in Texas. This engine used approximately one barrel of fuel oil per day and 2½ gallons of lubricating oil. The general performance of this engine has been unsatisfactory.

In summation of cable tool drilling, electric prime movers are the most satisfactory from the standpoint of low operating costs. The future will see rapid development of electrically operated equipment, One item in favor of electric equipment is the efficient production machinery which may be operated at low cost.

Rotary Tool Prime Movers

Prime movers are used on rotary drilling wells for two purposes. First, to operate the drawworks and second, to operate the slush pump.

Former practice has been to connect a steam engine to the drawworks and to directly connect a steam cylinder to a duplex slush pump. This is as yet the most common practice. All of the prime movers at Oklahoma City Field, with but one exception, are steam engines. The men are familiar with this class of equipment and it is powerful and reliable. This causes it to be a favorite in deep, expensive drilling.

The most recent engines are equipped with roller bearing crankshafts, balanced piston steam valves, steam traps and force feed lubrication. All working parts are enclosed, all moving parts flooded with oil.

The duplex steam pumps have balanced piston valves, force feed lubricators, 18 and 20-inch stroke, large valve ports, stream line fluid flow and cushioned pistons. These pumps are designed to work with high steam and water pressures. However, one pump has an adjustable valve port which automatically controls the admission of steam to the cylinder in such a manner that the mechanical thermal efficiency is not impaired.

Ignoring fixed charges which are generally considered at 2 per cent per month, the maintenance cost of a 12-by-12-inch twin cylinder engine is approximately $1 per day. The latest type roller bearing engines will be less than $1.

The steam end of the slush pump runs less than 30 cents per day, but the fluid end is very expensive to maintain.

The maintenance cost of steam boilers, minus fixed charges, averages not less than $8 per day per battery.

Except for the electric differential drives, no method of drive from the motor to the draw works has been satisfactory in all instances. A special installation uses a shaft drive through a selective gear transmission. However, in this instance, the prime mover is a multicylinder vertical steam engine.

Slush Pumps

The use of multi-V-rope drives is successful with slush pumps. Many hook-

CHART No. 4

CABLE TOOL COST PER FOOT FOR GAS AND WATER—SEMINOLE AREA

Hole made with C. tools feet	Days used gas and water	Average hole p/day feet	Gas used on well M ft.	Av. gas used p/day	Total cost for gas	Average cost p/day for gas	Cost p/ft. for gas	Water used on well	Av. water used p/day	Total cost f/wtr.	Av. cost p/day for water	Cost per foot for water	Cost per foot for gas and water
341	18	18.9	2,864	159.111	$641.00	$35.61	$1.88	2,900	161	$145.00	$8.05	$.42	$2.30
448	15	29.8	1,890	126 000	472.50	31.50	1.05	2,654	177	132.70	8.84	.30	1.35
377	15	25.1	1,270	84.667	317.50	21.17	.84	3.078	205	153 90	10.26	.41	1.25
387	16	24.1	2 156	134 750	539.00	33.69	1.39	3,875	242	193.75	12.11	.50	1.89
337	17	19.8	1,800	105,882	450.00	26.47	1.33	5.416	318	270.80	15.93	.80	2.13
428	14	30.5	1.283	91,643	320.75	22.91	.75	3,167	226	158.35	11.31	.37	1.12
457	16	28.5	1,818	113.625	454.50	28.41	.99	3,261	204	163.05	10.19	.36	1.35
435	21	20.7	3,905	185,952	976.25	46.48	2.24	3.261	155	163.05	7.76	.37	2.61
425	17	25.0	1,452	85.411	363.00	21.45	.85	3,261	192	163.05	9.59	.38	1.23
430	21	20.5	2,396	114.095	622.16	29.66	1.44	3,261	155	163.05	7.76	38	1.82
245	25	9.8	3,248	129,920	812.00	32.48	3.31	1,736	69	86.80	3.47	35	3.96
4 310	195	252.7	24,082	1,331,056	$5,969.46	$329.83	$16.07	35,870	2,104	$1,793.50	105.27	$4.64	$21.01
Average 392	17.7	22.9	2,189	121,005	542.67	29.98	1.46	3,261	191	163.22	9.57	.42	1.91

CHART NO. 5

AVERAGE FUEL COSTS FOR ROTARY TOOL DRILLING WELLS, SEMINOLE AREA

			ELECTRIC POWER				WATER				ENERGY AND WATER			
No. wells	Depth	Drilling days	Total K.W.H.	Avg. K.W.H. P/ day	Avg. K.W.H. P/ ft.	Total cost	Avg. cost P/ day	Avg. cost P/ft.	Total bbls.	Avg. bbls. P/day	Avg. bbls. P/ft.	Total cost	To al cost	Avg. cost P/day	Avg. cost P/ft.
26	4,014	37	122,700	3,320	31	$2,062	$56.00	$0.51	9,280	250	2.31	$ 468	$2,530	$68	$0.63
9	4,035	47	147.530	3.140	36	2,540	54.00	0.63	10,575	225	2.62	588	3,128	66	0.78
21	3,968	32	103,002	3,220	26	1,648	52.00	0.414	7.092	225	1.78	355	2,003	64	0.502
					M. CUBIC FEET GAS			STEAM POWER WATER				FUEL AND WATER			
14	4.243	43	18.017	419	43	$4.435	$103.00	1.07	47.300	1.100	11.0	$2.213	$6 648	$155	$1.57
19	3 930	41	19.851	485	50	4.652	113.00	1.18	42,500	1,036	11.0	2.125	6,778	165	1.723
3	3,117	30	12,938	432	42	2,588	86.00	.83	31,692	1,056	10.0	1,585	4,172	139	1.338

ups have been designed in order that the internal combus ion engines may be used. In the majority of cases, these installations used a multiplicity of shafts, chains and clutches, as well as a reversing gear. No successful application of this type of equipment has been made for heavy duty work, except in one instance.

One instance is known where a portable electric alternator was rigged to an internal combustion engine. The current generated was used to drive the regular oil field type motor.

It is the contention of the writer that hydraulic motors are especially well adapted to the rotary rig. The variable speed, constant torque and constant speed, variable torque features would be particularly useful. The writer suggests the "A" motor operated by either an internal combustion or an electric motor; the "B" motors being mounted on the hoist, rotary machine and pumps.

The operating cost record of a three-unit Waukesha motor rotary drilling rig follows. The motors developed 275 horsepower at 1,000 revolutions per minute. Closed radia or fan cooling system was used. In this instance, a 9½-inch hole was cut to 3,104 feet. Six and five-eighths-inch pipe was set at 3,099 feet. Gas was the fuel used and the average consumption was 52,000 cubic feet at 20 cents per thousand. Makeup water for the mud was approximately 200 bbls. per day.

Total Cost of gas per day	Total Cost of gas per foot	Cost of water per day
$10.40	$0.13	$10.00

The same installation using weathered casinghead gasoline as fuel at 12 cents per gallon was erected. The well was drilled to 4 343 feet and 8¼-inch, 32-pound casing set.

Total cost of fuel, 25,785 gallon including hauling	$3,675
Total cost of water	604
Total cost of light	62
Total cost of fuel, water and light	$4,341
Cost per foot	$ 0.9992
Cost per day	$106.00

The same installation located in Ellis County, Kans., using straightrun gasoline as fuel:

Cost per foot	$0.6637 Gasoline
Cost per foot	0.0199 Oil
Cost per foot	0.0096 Grease
Cost per foot	0.0880 Water
Cost per foot	0.7812 Total

This well was 3,460 feet deep, drilling time was 35 days. The fuel cost is much lower than a cable tool rig powered by a Waukesha using gasoline previously mentioned.

The cost of operating this rig increased with depth. The excellent run with gasoline in Kansas, was likely due to a better grade of fuel.

Energy Cost

The following gives the energy cost for two electric rotary rigs equipped with Hild Drive using twin motors.

Location—Wichita, Kan.:

Depth Feet	Drilling Days	Total K.W.H. Used	Avg K.W.H. Per Days
2,923	21	66,800	3,181
3,060	29	90,500	3,120

The energy cost per foot of these two wells compare very favorably with the averages of electric cable tools drilled in the same area. These average costs were 31 and 26 cents.

As previously stated, the arithmetic average cost of all the wells drilled in the Seminole area, is a reliable figure on which an estimate can be based.

Explanation of Charts

The costs given in Chart No. 2 are taken from actual metered gas and water. The costs of two of the wells are almost identical. They are, in fact, offset wells. The third well was drilled under somewhat different conditions, had trouble, which accounts in part for the greater expense.

Refer to Chart No. 3, "Analysis of Consumption and Cost of Electric Power for Drilling Wells." In this chart is shown cost of electric power for rotary drilling and the subsequent cost when the well is drilled in by electricity. Some very favorable runs of electric powered wells have been shown on this chart.

Refer to Chart No. 4, "Cable Tool Cost Per Foot for Gas and Water—Seminole Area." In this chart, the analysis of cable tool rigs using steam indicates a gas cost equal to the cost of energy. The electric rig uses very little water, so the difference in cost is about equal to the water bill. Preferential conditions alone should determine the class of equipment used for drilling in at Seminole.

Referring to Chart No. 5, direct comparison will be noted between electric powered rigs and steam rigs with gas fuel. Gas is about twice as expensive as electric power under the conditions existing at Seminole. Steam rigs use about four times as much water as electric rigs.

The power cost to a company using steam rig is about 2½ times more than the power cost to a company using electric driven rig. This amounts to about $1 per foot at Seminole.

Previous mention has been made of fixed charges and repair charges of rotary rigs.

In summation of the operating costs and desirability of electric rigs over steam rigs, is a matter of geographic and geologic location. In deep fields such as exist at Oklahoma City and Marshall, Okla., steam rigs will be used. This will be because of large quantities of free gas

Cost of water per foot	Total Cost per day	Total Cost per foot
$0.128	$20.40	$0.256

available as fuel. In both of these districts, sufficient water was available to carry on the development program.

The steam rig will be changed very little in the future. The major changes will be refinements giving efficiency and economy of operation.

The improved and developed electric rig will be the most desirable rig to use from the operating point of view, but the improved rig will in no wise resemble the present one.

Operating costs will be closely followed.

The rig most widely used will be the rig which will drill and complete a satisfactory hole in an economic fashion.

GULF COAST MARKET SLIGHTLY UNSETTLED

HOUSTON, Tex., Oct. 8.—Gulf Coast pale and red oils faced a slightly unsettled situation at the opening of the week with a tendency of sellers to weaken on their quotations to meet competition. Although a fair movement of the various grades continued about as usual, it was evident that the shading of prices amounting to one-eighth to one-fourth cent, in some cases indicated a softer market. Sellers, however, still have

Avg K.W.H. Per Ft.	Total Cost of Energy	Cost per day for Energy	Cost per foot for Energy
22.9	$1.024	$48.77	$0.3504
29.3	1.362	46.95	0.4449

made no official reductions in their posted quotations.

Fuel oil and gas oils continued only slightly changed in their general tone. Gas oil prices of 4 to 4¼ cents could be shaded some but the prevailing market remained unchanged. Very little gas oil has been moving for several weeks and at the opening of this week one refiner of an exceptionally good grade of material was in the market to dispose of a cargo. Bunker fuel for cargo movement is still being held for a minimum of 75 cents with little demand. Although tanker rates have slipped off in the past two weeks to around 32 cents there has been no noticeable activity in efforts to move material to the East Coast. Several of the major refiners are increasing their cargo movements but are doing so in their own boats and to established outlets but the open market is decidedly inactive.

OIL HAS BIG PART IN KAFIR CORN CARNIVAL

An Oil Industrial Exposition is to be held in conjunction with the Kafir Corn Carnival in Eldorado, Kans., October 16, 17 and 18. Hundreds of persons interested in various branches of the petroleum industry or in the manufacture of oil-field equipment will have a part in this major feature of Butler County's unique festival.

More than 50 exhibitors already are listed with the committee in charge, and others are coming in. Nearly two full business blocks of oil exhibits will be entered before the opening of the carnival, according to the management. During the three days more than 50,000 persons from Kansas and Oklahoma are expected to attend.

Wichita, Kans., leads in the number of out-of-town exhibits, with many others coming from Tulsa and Kansas City, Mo., and Texas, Ohio, Pennsylvania and other states will be represented. Exhibitors who already have engaged space include: Skelly Oil Co., Eldorado and Tulsa; Kansas Paint & Color Co., Wichita, Kans.; Western Iron & Supply Co., Wichita; Walter O'Bannon Co., Tulsa; Tidal Oil Co., Tulsa; Empire Oil & Gas Co., Bartlesville, Okla.; Wichita-Ponca Tent & Awning Co., Wichita; United States Tire Co., Akron, Ohio; Vacuum Oil Co.; Thompson Brothers, Eldorado; Eldorado Refining Co.; American Steel Works, Kansas City, Mo.; Kansas Oxy-Acetylene Co., Inc.; International Harvester Co., Chicago; Western Machinery Co., Wichita; Southwest Cracker Co., Wichita; Wilson Hardware Co., Eldorado; Taylor Instrument Co., Tulsa; Kansas Gas & Electric Co., Eldorado; Firestone Tire & Rubber Co., Akron; W-K-M Co., Houston, Tex.; Spencer Trailer Co., Augusta, Kans.; S-G-S Radio Co., El Dorado; R & F Electric Co., Augusta; General Tool & Machinery Co., Augusta; Drane Tank Co., Tulsa; Jensen Jack Co., Coffeyville, Kans.; Underwood Typewriter Co., New York; Rorabaugh's, Wichita; Refinery Supply Co., Tulsa; Buffalo Engine Co., Eldorado; Ehrich Supply Co., Kansas City; Mountain Iron & Supply Co., Wichita; Axelson Machine Co., Los Angeles, Calif.; Burt Corp., Tulsa; Hudson Battery Co., Eldorado, and The Texas Company.

Lewis A. List is chairman of the committee in charge and Edgar Golden, secretary. The other members are T. A. Helling, general manager, Eldorado Refining Co.; Harry Miller, purchasing agent, Skelly Oil Co.; William G. Wilkins, engineer, Gulf Pipe Line Co.; Robert H. Bradford, producer; Robert H. Hazlett, producer; N. F. Frazier, producer; F. H. Haines, producer; Mason & Ralston, producers; F. A. Pielsticker, vice president, Skelly Oil Co.; Joe Logue, superintendent, Magnolia Petroleum Co.; Al Becker, superintendent, Phillips Petroleum Co.; W. A. Midkiff, superintendent, Prairie Pipe Line Co.; John Winters, superintendent, National Refining Co.; O. J. Connell, president, Connell Oil Co.; Ray Elliott, Prairie Oil & Gas Co.; J. L. Dimit, superintendent, Gypsy Oil Co.; J. G. Dickinson, superintendent, Empire Oil & Gas Co.; C. C. Cox, manager, National Supply Co.; B. F. Mouser, superintendent, Sinclair Oil Co.; O. A. Kent, manager, Continental Supply Co.; W. F. Kaiser, manager, Frick Reid Supply Co.; T. E. Dawson, manager, Oil Well Supply Co.; H. H. Fenton, district manager, Jarecki Manufacturing Co.

LAGO PRODUCTION

NEW YORK, Oct. 7.—Lago Oil & Transport Co. during the week ended September 27 produced 673 224 bbls. of crude oil in Venezuela, a daily average of 96,175 bbls., compared with 59,421 bbls., or 94,203 bbls. per day, in the previous week. Shipments for the week amounted to 668 284 bbls., an average of 95,469 bbls., compared with 654,517 bbls., or 93 502 bbls. per day, in the preceding week.

EXECUTIVE COMMITTEE OF GEOLOGISTS MEETS

Taking advantage of the fact the International Petroleum Exposition is in progress in Tulsa this week the executive committee for the American Association of Petroleum Geologists held an executive session here Thursday and Friday of last week at which J. Y. Snyder, president; R. S. McFarland, A. R. Denison and Frederic H. Lahee were present, the other member of the committee, Fred H. Kay, being unable to attend.

Matters pertaining to spring meeting to be held in New Orleans March 20-22 next year were discussed and it is understood that plans are progressing nicely and it is hoped to make this meeting quite outstanding in the association's history.

GETTING ANOTHER TANKER

Construction is to commence soon of a second coastwise, Diesel-electric tanker for the Tide Water Oil Co. to carry gasoline and lubricating oil. Like the first boat, her capacity will be approximately 20 000 bbls. of gasoline and approximately 55,000 gallons of lubricating oil, the latter to be carried in individual tanks in the forward hold space. Her route will be along the Atlantic Coast, the same as her sister tanker. She will carry a crew of 18 men. The new boat, with the exception of minor changes, will be a duplicate of the first, built this year and now in service. It will have a length of 255 feet, a beam of 44 feet, a draft of approximately 15 feet 6 inches and a deadweight of about 2,400 tons.

SKELLY OIL CO'S PICNIC

Probably the largest gathering of employes of one oil company attending this year's Petroleum Exposition in Tulsa was from Skelly Oil Co. The company held a picnic in Tulsa Friday commemorating its tenth anniversary and its employes remained over Saturday to attend the Exposition. About 1,000 employes were present. The out-of-town contingent was confined to those who have served the company continuously for 5 years or more. Honored guests at the picnic were 15 employes who have completed 10 years of continuous services with the company. President W. C. Skelly presented each of them with a gold 10-year service medal.

LOUISIANA ROYALTY

SHREVEPORT, La., Oct. 7.—A royalty check for $740, the first, was received by the registrar of the state land office at Baton Rouge this week from The Texas Company, operating the lands in Terrebonne Parish leased last year to the Louisiana Land & Exploration Co. Production from which this royalty was derived is in the recently opened Lake Pelto and Dog Lake Bayou areas. In addition to this, the State was paid a bonus of $103,000 for a five-year lease and still further income is derived from the severance tax.

ARGENTINE OIL BILL DEFEATED

The last act of the Argentine senate before the expiration of this year's regular session was a refusal to be stampeded into passing a bill nationalizing petroleum lands. The Chamber of Deputies passed a bill last year patterned after the Mexican law designed to expropriate Standard Oil and other foreign holdings, and place petroleum lands under government operation. The administration senators tried to force the measure to a vote in the last few hours of the session and were defeated.

SELL SPECIAL NAPHTHAS

The Industrial Naphthas & Solvent Co. has been organized in Texas with headquarters in Wichita Falls, Tex. The company was incorporated by W. C. Duncan, J. C. Rudy and C. W. Scharatt. Mr. Duncan will be in charge of sales. The company will specialize in the sale of naphthas and solvents.

EXPORT BUYERS IN OKLAHOMA MARKET

(Continued from Page 52)

out going to a high gravity, low endpoint gasoline. These characteristics are secured with a low distillation range up to the 50 per cent point emphasis being placed on a low initial and 10 per cent point. Many sellers guarantee these specifications in their regular U. S. Motor grade.

The other development centers around the constantly increasing demand for gasoline high in antiknock rating. One refiner who has made a detailed study of this situation both from manufacturing and marketing angles believes the day is not far distant when premiums in refinery gasolines for domestic shipment will be a matter of antiknock rating rather than the gravity and low endpoint as in the past. This situation in fact already obtains on a limited scale among many buyers but this particular refiner looks for a general acceptance of this rating within another 12 months.

Practically all of the larger refiners and many of the smaller plants now have knock testing machines and furnish their salesmen with guarantees regarding the antiknock rating of their motor fuels. The main drawback to a general acceptance of this specification lies in the fact that the method of testing has not been standardized so there is no general basis of acceptance in marketing. However, this is a detail which will be worked out provided there is a sufficient demand from the trade.

Change in Specifications

As an illustration of what this change means in marketing the case of a large middle western jobber is cited. This jobber for years secialized on a high gravity, low endpoint grade ot gasoline which was sold to consumers at a premium of 3 to 4 cents. This company a few years ago sold approximately as much of this premium grade as it did the ordinary grade. Recently, however, the sales of the premium grade although the differential has been reduced, has fallen off. An investigation led to the conclusion that this premium business was going to the sellers of Ethyl Gasoline and the company recently obtained a license to sell the product. The experience of one of the large Standard companies was similar.

The trend in premium motor fuels over the past few months has been toward the Ethyl Gasoline in which a chemical is used to secure a standard antiknock rating in motor fuels. But even in the ordinary domestic grades of gasoline the jobbers place the emphasis on this specification and favor the refiners who, due to the quality of their crude oil or their manufacturing operation, can furnish the product with the highest antiknock rating.

Aiding West Texas

Incidentally this situation is aiding the group of new refiners in West Texas. The gasoline from West Texas crude oil in the early history of the field was often times difficult to sell because of the high sulphur content, failure to meet the usual color requirements and low gravity. Several of the refiners by improved operation have been able to overcome these difficulties and in addition are creating a wide demand for their gasolines by pointing to the naturally high antiknock rating. It is possible as one refiner says "that the despised gasoline of the past may be the premium gasoline of the future."

Independent Buying

Another phase of the export purchases of the past week lies in the fact that part of the buying came from socalled "independent" sources as distinguished from buyers affiliated with the Petroleum Export Association. It is no secret that several refiners in the Mid-Continent including a few of the larger operators have accumulated substantial quantities of high gravity gasoline in the expectation that they would be able to move it through export and domestic channels.

The export business coming from the companies affiliated with the export association has been light and coupled with the slow domestic demand has brought about a stock situation which is burdensome in some cases and more independent buying is predicted unless conditions change.

Gasoline and Naphtha

So far there has been no general move on the part of the larger refiners to meet the constantly lower prices available from other refiners in gasoline sales. Several of these larger operators have sufficient stations of their own and long-time contracts with jobbers to dispose of the bulk of their gasoline output.

The refiners who depend on the spot market and month-to-month contracts for their outlets are having difficulty in keeping their current output moving to the trade. Sales of U. S. Motor gasoline direct to the trade at 6¾ cents have been made with resale material as low as 6½ cents in Oklahoma.

The export business previously mentioned was placed on a basis of 7.4 cents for the 375 endpoint gasoline and 7¼ cents for 390 endpoint. An Arkansas refiner is reported to have sold some 400 endpoint gasoline for export on a basis of 7⅛ cents Oklahoma.

The two largest factors in the Oklahoma naphtha market continue to quote 7½ cents for 450 endpoint naphtha. Most of the sales are for local delivery.

Kerosene and Distillate

The price range on the 41-43 water white kerosene is 4¾ cents to 5½ cents. The high price is still being quoted to the jobbing trade by a few refiners while other refiners have found it necessary to sell specification material as low as 4¾ cents. One purchase of resale material was reported at 4½ cents. One purchase of approximately 1,000,000 gallons was made by a company for domestic delivery. The price paid ranged from 4½ cents North Texas to 5 cents.

Most of the refiners are quoting a low of 4 cents for the better grades of distillates with a low of 3¾ cents for the lower gravity and high flash grades. More material has been available over the past week.

Fuel Oil and Gas Oil

The better grades of gas oil especially those of low cold test which are used for furnace oil are scarce in Oklahoma. Considerable material was sold in Oklahoma over the past week at a price range of 3 to 3¼ cents. An occasional sale of U.G.I. gas oil at 2⅞ cents is reported.

The most important factor in the Oklahoma spot market for fuel oil has sold practically all the material available from its plants for October delivery and this situation has served to strengthen further the market on the low gravity grades. The bottom price on any commercial grade in Oklahoma now is 55 cents with many refiners quoting 60 and 65 cents for grades under 18 gravity.

The higher gravity grades are also scarce. The 28-30 gravity grade is in demand with a low of $1.05 established. One sale of zero cold test material of this gravity at $1.20 was reported.

Natural Gasolines

There is considerable speculation regarding the immediate future of the natural gasoline market. Several have been expecting a 6-cent market for the A and AA grades but as yet only a few scattered sales have been reported under the 6½-cent price which was effective a week ago. While no large orders have been reported for October delivery the contract movement is satisfactory with a fair spot business. On Monday the B, BB and C grades were bringing 6⅜ cents.

NATURAL GASOLINE OVER 6,000,000 GALLONS DAILY

(Continued from Page 225)

greater than in August of last year when the month's total was 144,400,000 gallons. The greater part of this 44,900,000-gallon increase over August of last year came from the California fields. The August production in California totaled 74,700,000 gallons, an increase of 26,300,000 gallons over the same month in 1923.

Texas showed the largest increase in August over July of this year. The production increased 2,100,000 gallons. All of this increase can be accounted for by the increased output of the Texas Panhandle where the production totaled 15,800,000 gallons in August. The development of the Gray County fields in the Panhandle has furnished a large new supply of casinghead gas. Several new plants have been built in various fields of the Panhandle and old plants have been enlarged.

California production also increased approximately 1,000,000 gallons in August. The bulk of the increase came from the Santa Fe Springs Field.

Stocks Less

Although the production in August brought a new record for the industry the demand showed an even larger increase and stocks of natural gasoline declined. Stocks on July 31 totaled 48,543,000 gallons, and this had been reduced to 37,524,000 gallons on August 31. Approximately 7,000,000 gallons of this decrease was in Texas and 3,000,000 gallons in Oklahoma. The demand for natural gasoline in August was exceptionally heavy.

BOILER EFFICIENCY AND STEAM ENGINEERING

(Continued from Page 225)

Fahrenheit into steam at 110 pounds gauge pressure.

The equivalent evaporation of this boiler is equal to:

$$1000 \times \frac{(H - t + 32)}{965.8}$$

Substitute for H the value found in steam table, and for t the observed feed water temperature; the formula becomes

$$1000 \times \frac{(1184 - 150 + 32)}{965.8}$$

= 1104 pounds, the equivalent evaporation per hour.

The horsepower of the boiler, which is obtained by dividing the total equivalent evaporation by 34.5, the equivalent of 1 horsepower, is,

1104 ÷ 34.5 = 34 horsepower per hour.

The amount of water evaporated in a test may be taken as equal to the amount of feed water supplied without introducing any serious error.

The accompanying steam table is a very condensed form, and for a more complete table on saturated steam the writer refers you to Marks and Davis table on the properties of saturated steam.

PROPERTIES OF SATURATED STEAM

Absolute pressure P	Temperature Fahrenheit t	Heat of liquid from 32 degrees F. q	Total heat from 32 degrees F. H	Latent heat of evaporation r	Volume of 1 lb. in cu. ft. v	Weight of 1 cu. ft. in lbs. w
14.7	212.00	180.8	1,146.6	965.8	26.60	.03760
70.0	302.71	272.2	1,174.3	902.1	6.144	.1628
110.0	334.56	305.2	1,184.0	878.8	4.026	.2484
250.0	400.99	374.7	1,204.2	829.5	1,854	.5393

The various properties of steam, with their symbols, as given in the steam table are as follows:

1. The temperature t, of the steam, which is the boiling point of the water from which the steam is formed.

2. The heat of the liquid q, which is the number of B.t.u. required to raise the temperature of 1 pound of water from 32 degrees Fahrenheit to the boiling point corresponding to the given pressure.

3. The latent heat of vaporization r, often termed the latent heat, which is the number of B.t.u. required to change 1 pound of water at the boiling point into steam at the same temperature.

4. The total heat of vaporization H, often termed the total heat, which is the number of B.t.u. required to raise 1 pound of water from 32 degrees Fahrenheit to the boiling point for any given pressure and to change it into steam at that pressure. It is the sum of the heat of the liquid and the latent heat.

Note: The British thermal unit, abbreviated B.t.u., is the amount of heat required to raise the temperature of 1 pound of pure water 1 degree Fahrenheit at or near the temperature 39.1 degrees Fahrenheit, which is the point of maximum density of water. B.t.u. is also defined as 1/180 of the heat required to raise the temperature of water from 32 degrees Fahrenheit to 212 degrees Fahrenheit, which is equivalent to the above definition.

PANHANDLE AREA LEADS IN TEXAS PRODUCTION

Natural gasoline production in Texas continues to show a steady increase. The older areas, some of which have had natural gasoline plants in operation for a period of 15 years show very little change in output while the production of the newer areas is mounting from month to month according to a report covering the August operations.

The Texas Panhandle now leads all other areas in Texas in natural gasoline output. The production of the plants in that area has increased rapidly over the past six months. The field first had a rapid increase in output during 1925 and 1926 due to the discovery of large production in Hutchinson County with small output in Carson and Gray Counties. The field was operated largely on a settled basis in 1927 and 1928.

During the past year new pools have been opened up in Gray County and this has given the necessary casinghead gas for the building of new plants and the enlargement of units already in operation.

The following table summarizes the natural gasoline production by areas (output given in barrels):

North Central Texas	
Eastland County	143,000
Shackelford County	36,000
Brown County	18,000
Stephens County	103,000
Coleman County	2,000
Palo Pinto	12,400
Jones County	3,800
Texas Panhandle	
Carson County	49,300
Hutchinson County	155,500
Gray County	135,000
Potter County	1,300
Moore County	6,700
Wheeler County	11,400
West Texas	
Reagan County	27,700
Howard County	700
Crane County	43,400
Wichita Falls Area	
Electra	17,600
Burkburnett	29,600
Iowa Park	950
Petrolia	1,600
Vernon	16,000
Archer County	4,600
Young County	23,100
Woodson	1,500

OVERPRODUCING BRINGS CUT

Commenting on the most recent cut in the price of Pennsylvania Grade crude oil, the Bradford Era quotes a prominent Bradford oil man as saying that overproduction was responsible for the 25-cent reduction.

One large property in the Bradford Field, the Era's informant is quoted as saying, has increased its production 51 per cent over its January output, and other leases in the Bradford and Allegany Fields are being forced to their capacity with the result that they have increased the supply of Pennsylvania Grade crude to a point beyond the refinery demand.

The fields producing Pennsylvania Grade oil were credited by the Bureau of Mines with a total daily average production of 64,300 bbls. in January and 72,000 bbls. in August, an increase over the whole field of 7,700 bbls. a day. Most of this increase was in the Bradford and Allegany Fields. Southeastern Ohio showed no change; West Virginia increased an average of 500 bbls. a day; New York, 1,000 bbls. a day and Pennsylvania 6,200 bbls. a day.

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For More Oil and More Profits
Use
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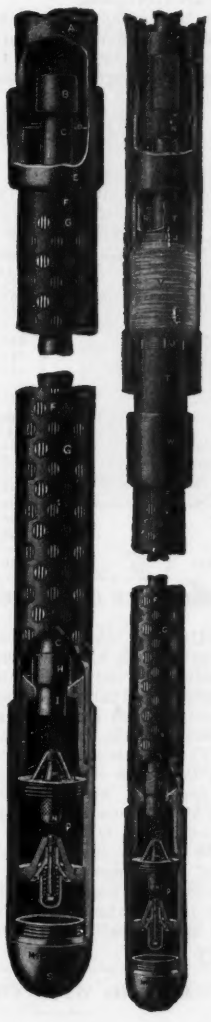
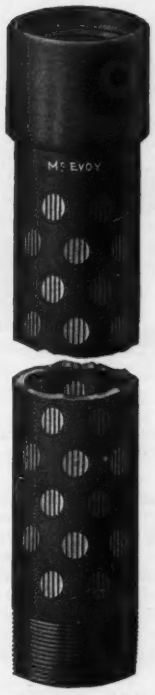
Complete setting for single and double string wells



(Patented)

McEvoy New Screen Pipe



(Patented)

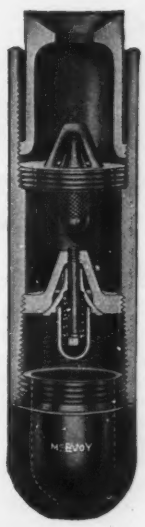
The screen is at the point where the money is made. On one side is the oil sand that has possible value. On the other is oil that has real value.

Oil men who have the reputation for doing everything "just right" are very careful when it comes to the work done and the kind of equipment used at the bottom of the well .... the point where potential profits are transformed into real profits.

There is a reason why so many of them use McEVOY WIRELESS STRAINER and other McEVOY PRODUCTS at this point.

Write, or wire for complete information on McEvoy Products.

Flush Joint Screen Pipe



(Patented)

Set Shoe Assembly

McEvoy Flush Joint Bailer

(Patented)

J. H. McEVOY & COMPANY
HOUSTON, TEXAS, U.S.A.
Pacific Coast Branch: McEvoy Screen Pipe Co., 2428 E. 56 St., Los Angeles, Calif.

Of Interest to Sales Departments

Gasoline Obtained From Venezuela Oil Factor in Markets

NEW YORK, Oct. 7.—Venezuelan gasoline imports, comparatively inconsequential until the past month or so, have now reached the point where the South American product is assuming the proportions of a major factor in the refined products situation in eastern markets, rivaling California motor fuel in importance in this area.

Gasoline production along the Atlantic Seaboard during the past several months has not been heavy. Left to itself, the East Coast gasoline market would be in a flourishing condition. As it is, however, the situation has been affected appreciably by heavy receipts of motor fuel from the Pacific Coast throughout the entire summer season, and this movement of gasoline produced elsewhere into the marketing territory in the Atlantic states is now being swelled by heavy imports of Venezuelan gasoline.

Venezuela Expansion

Total stocks of gasoline held by refiners in the East Coast area, the section of heaviest consumption, amounted to but 4,861,000 bbls. on July 31, 1929, according to the Department of Commerce summary. On the same date, however, California stocks aggregated 12,383,000 bbls., and the steady movement of the Pacific Coast surplus into consuming channels in the East has been one of the depressing influences upon the Eastern market situation. With Venezuela now forging rapidly to the fore as a supplier of refined gasoline to Atlantic Seaboard markets, in addition to the continued heavy shipments of Venezuelan crude to the East Coast area, the "balance of power" in Eastern gasoline marketing circles is showing further readjustments.

Pan American Petroleum & Transport Co. is now bringing in gasoline from its refinery at Aruba, Dutch West Indies, in increasingly large quantities. While much of this gasoline has been coming in at Baltimore, some quantities are also finding their way to New York and Boston. At the present time, it is estimated, the Pan American refinery at Aruba is shipping gasoline at the rate of 250,000 bbls. monthly to the Atlantic Coast, with expectations that East Coast receipts from this source will show a steady increase and reach the 500,000-bbl. per month mark in the near future. Thus far, the imports have been centered to a great extent at Baltimore owing to the fact that the American Oil Co., marketing subsidiary of the Pan American Petroleum & Transport Co., operates out of that city, supplying the large territory which it services in the South Atlantic states from its Baltimore terminal. Pan American, however, also possesses distributing facilities in the New York and New England territory, and it is expected that heavier receipts of Venezuelan gasoline will be witnessed at New York and Boston during the next several months to take care of the Pan American distribution in these territories.

Shell Eastern Petroleum Co., which has attained such an important place in the Eastern marketing industry since the first of the year, is understood to be basing its Atlantic Seaboard operations partially on Venezuelan crude and gasoline. Practically all of the gasoline which Shell has been marketing along the Atlantic Coast this summer has come from the Royal Dutch refineries at Curacao and other points in the Dutch West Indies.

Gulf Refining Co. is now supplying a

(Continued on Page 273)

RADIO PROGRAM RESULTS IN LARGE GAIN IN BUSINESS FOR OZARK AREA

The radio program sponsored by the Pierce Petroleum Corp. of St. Louis has resulted in a large increase in tourist travel throughout the Ozark area of Arkansas and Missouri, according to hotel owners and others who cater to the summer visitors with a substantial gain in the consumption of gasoline, lubricating oil and greases.

The Pierce corporation, which has been a pioneer in providing facilities for motorists to encourage the greater use of cars, early in the summer season inaugurated a radio feature over KMOX, known as the "Know Your Ozarks" programs. Through the medium of the radio the attractive features of the Ozark Mountain region were made known to prospective tourists over a wide area. Representatives of Ozark towns and resorts who have special attractions for visitors took part in the programs. The new highway systems which have made the Ozark region accessible to the motorists were pointed out along with many entertainment features and places of scenic beauty.

The Pierce corporation supplemented the radio program with a tourist bureau maintained at its St. Louis headquarters. Literature describing the Ozarks with road maps were available at this bureau and also at the Pierce terminals and stations.

Officials at the St. Louis offices have letters from all parts of the Ozark region attesting to the success of their summer program. Resort owners, officials of chambers of commerce and others state that their patronage in many cases increased from 50 to 100 per cent over the previous year and a large part of the credit for this showing is given to the publicity received through the radio programs.

Gasoline Demand Gains

While no accurate figures are available as to the consumption of gasoline it is certain that a new record was established in the demand for all petroleum products used by the tourists. So successful was the summer season that the radio programs have been extended to November 1 by E. D. Levy, president of the Pierce corporation. Due to the mild climate, the Ozarks offer many attractions to visitors until late November, and it is believed that the usual summer season can be extended with a continuance of the educational programs.

The Pierce corporation through its new terminals and station facilities has been able to serve a large number of these tourists both within and adjacent to the Ozark region. The company has had large terminals in operation at Tulsa, Miami, Okla., Rolla, Mo., and Columbia, Mo. These terminals representing an investment of approximately $250,000 each in addition to a complete one-stop station service have elaborate restaurant accommodations. These accommodations include rest rooms, emergency hospitals and fountain service. The terminals have shown a steady increase in business.

For several weeks the company has operated its first Pennant Sandwich Shop. This is located on United States Highway No. 66, 15 miles west of St. Louis. This new facility offers all the service available at the terminals on a smaller scale. The company plans to build a number of these shops during the coming year.

The Pennant Sandwich Service of the Pierce Petroleum Corp., located near St. Louis, operated in conjunction with a one-stop service station.

An added service to tourists will be available at the Columbia and Rolla terminals within the next 30 days. The corporation is completing two 40-room hotels adjoining the present terminals. These hotels were built to provide the accommodations required by those who are traveling in cars. Another large terminal is to be built next year at Oklahoma City, Okla., where a site has been purchased.

OPENS NEW YORK OFFICE

CHICAGO, Oct. 7.—The American Mineral Spirits Co. of this city, marketers of naphthas and other special products, has opened New York offices and has arranged for storage at Bayonne, N. J. The offices will be under the management of Kenneth Huzzagh and Edwin Nielsen, both of whom have recently resigned from the Pan American Petroleum & Transport Co. to accept the positions.

The American Mineral Spirits Co. also states that it has contracted with a new refinery at Muskegon, Mich., and will take its entire output of naphthas, on which material the refinery proposes to specialize. The refinery has completed a series of test runs and will be in regular operation soon.

. SHELL IN SAVANNAH

NEW YORK, Oct. 7.—Shell Eastern Petroleum Corp. has started construction of a bulk gasoline and lubricating oil station and an office building at Savannah, Ga. The plant will be located on Atlantic Coast Line property, and will cost in the neighborhood of $30,000.

FORD PRODUCTION MAJOR FACTOR IN CONSUMPTION

Due entirely to the increased production of cars by the Ford Motor Co. the total number of cars in the United States and Canada continues to show a large gain over the same period last year. The latest available official figures including August production show a total of 4,443,450 cars for the first eight months of this year compared to 3,232,364 cars for the same period last year. In September it is certain that the car production passed the total for all of last year which was 4,601,141 cars.

The report for August shows that the Ford production was approximately 40 per cent of the total. Last year in August the Ford production constituted 20 per cent of the total. For the past five months the Ford production has averaged approximately 200,000 cars monthly.

The importance of the Ford output this year is clearly shown in the following tables covering production for the first seven months of 1929 and 1928:

Total for Industry

	1929	1928
January	422,537	240,191
February	497,639	336,300
March	625,843	430,783
April	663,237	434,315
May	635,630	459,725
June	566,867	425,195
July	517,854	417,312
Total	3,929,607	2,743,821

Ford Output (Estimated)

	1929	1928
January	154,155	5,549
February	155,210	15,782
March	180,238	30,750
April	198,891	38,653
May	206,733	53,908
June	184,159	61,804
July	206,977	73,442
Total	1,286,363	279,888

ORGANIZE CONOCO COMPANY

CHICAGO, Oct. 5.—The Conoco Oil Co. of Illinois has been organized as a subsidiary of the Continental Oil Co. of Delaware, the parent company which was recently formed through a merger of the Marland Oil Co. and the Continental Oil Co. The Illinois subsidiary was organized with the name of Conoco Oil Co. due to the fact that an independent company was already operating under the name of Continental Oil Co.

The Conoco company has taken over all of the former Marland properties in Illinois. The trademarks of all products have been changed to conform to those used by the Continental company in other states.

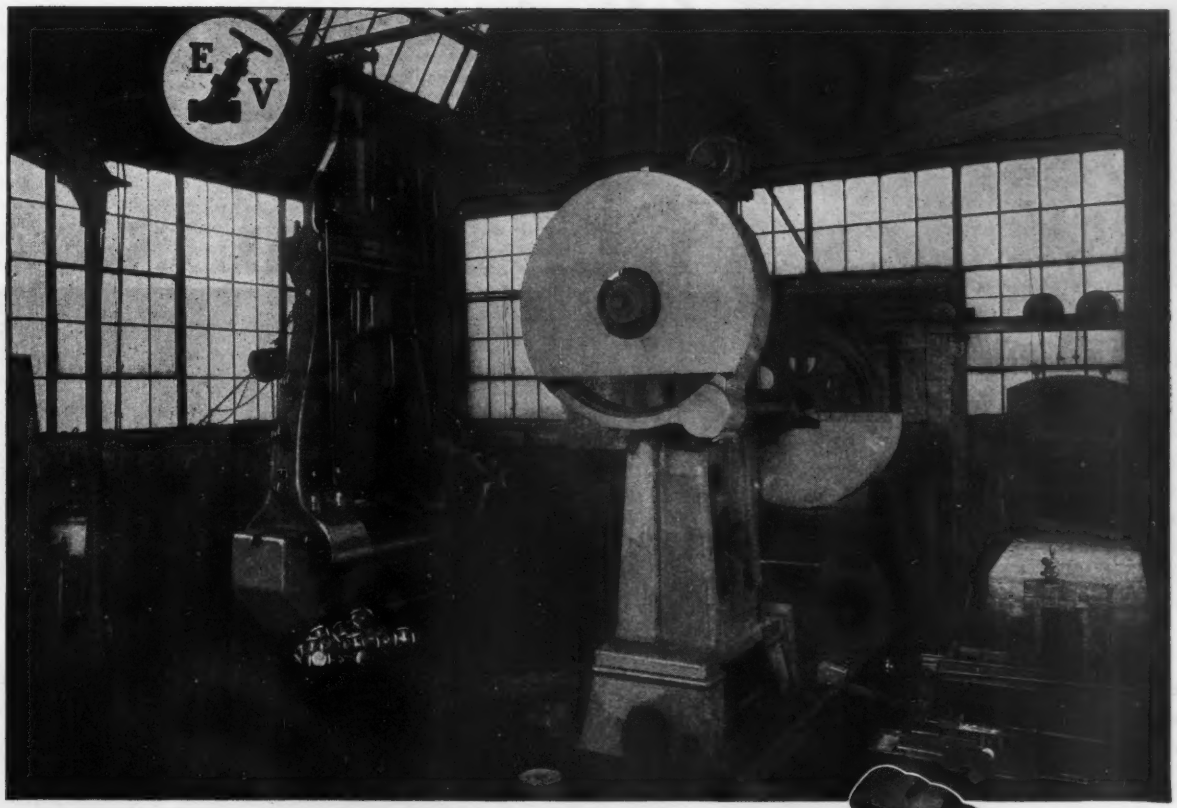
BAYARD WITH COSDEN

Harry Bayard, formerly of Ennis & Bayard and one of the oldest salesmen in point of service in the industry is now connected with the sales force of the Cosden Oil Co., Inc., with offices on the twenty-third floor of the Willoughby Tower, Madison and Michigan Avenues, Chicago. Mr. Bayard has had a long experience with several of the largest known refining and marketing organizations. His specialty has been fuel oils in which he is a recognized expert.

IMPROVE FILLMORE PLANT

The Texas Company of California is making important improvements at its Fillmore, Calif., refinery. The plant was acquired two years ago when The Texas Company took over the properties of the California Petroleum Corp.

The plant which has a rated crude oil capacity of 5,000 bbls. daily is to be improved generally and cracking equipment installed. The improvements will cost $750,000.



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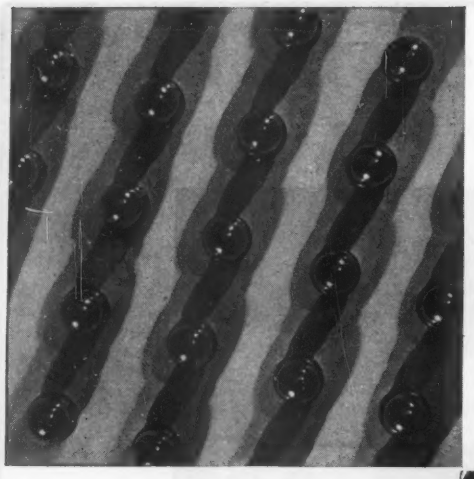
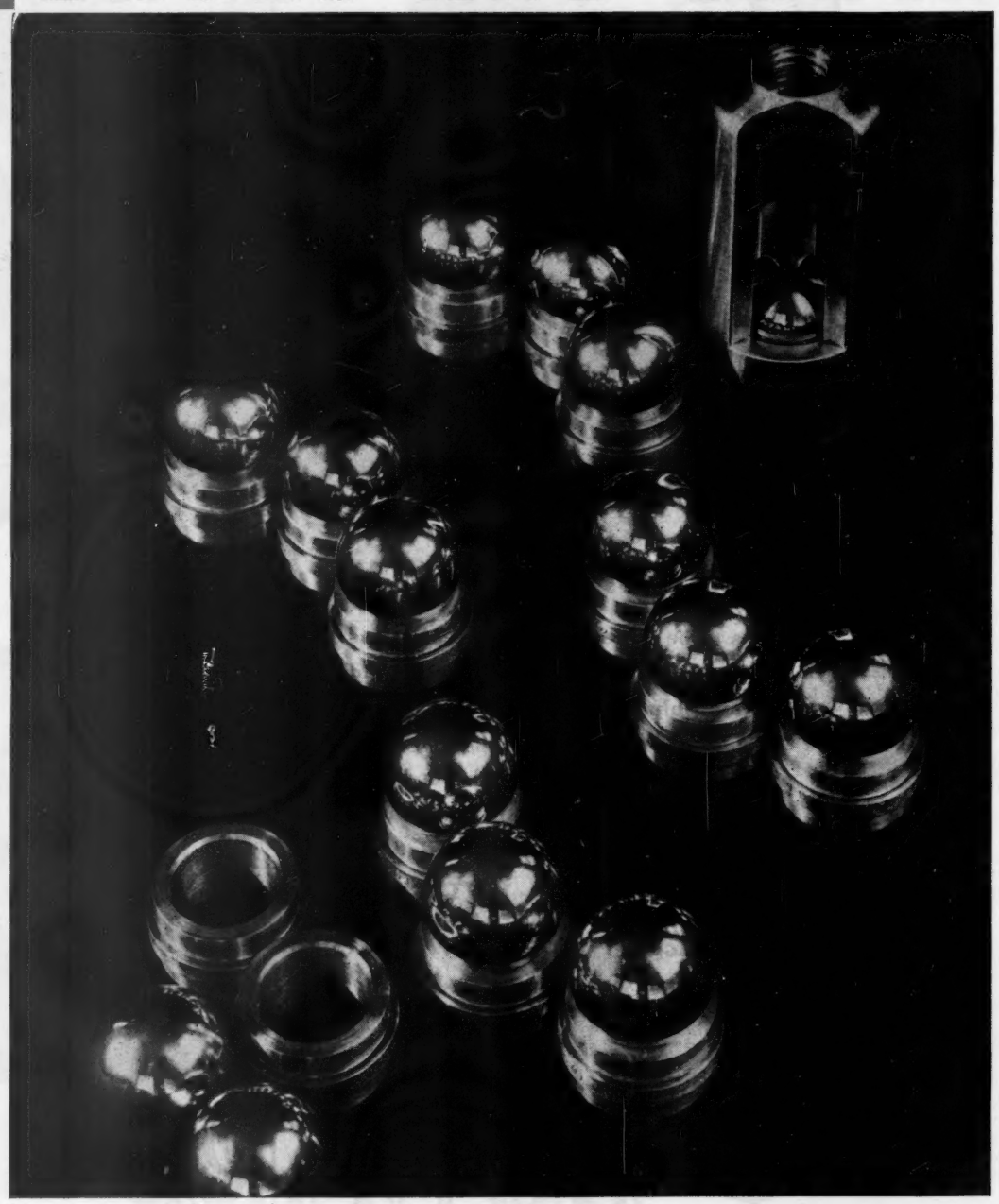
EDWARD VALVES



Axloy
BALLS AND SEATS



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METAL...
...EACH
BALL IS
GROUND
TO ITS
individual
SEAT.....

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HYDROGENATION AS IT IS COMMERCIALLY APPLIED

(Continued from Page 136)

American rights to the process were secured.

Synthol

The Fischer[27] process of hydrogenation of carbon monoxide to produce synthol developed by Franz Fischer, director of the Kaiser Wilhelm Institute for Coal Research, Mulheim, Ruhr, Germany, and his associate, H. Tropsch, also has to do with reactions between hydrogen and carbon monoxide in the presence of various catalysts.

The first work by Fischer and Tropsch followed the earlier work (1913) of the Badische Anilin u. Soda Fabrik, and was done in 1923 at high pressure and principally in the presence of the catalyst, alkalized iron. Other catalysts include iron, cobalt and nickel mixed with a small proportion of the oxide of the same metal.

Fischer and Tropsch's work resulted in the production of higher alcohols, ketones, aldehydes, besides some higher fatty acids. This was called synthol. Superatmospheric pressures were used. Fischer and Tropsch next (in 1926) proceeded to produce liquid and solid saturated hydrocarbons of the petroleum series with catalysts from carbon monoxide and hydrogen without the use of pressure and at a lower temperature 200-300 degrees Centigrade than that used in making synthol. More than 100 grams of solid, liquid and easily liquefiable hydrocarbons to each cubic meter of water gas were obtained. Paraffin hydrocarbons predominated in the product with some naphthenes and negligible amounts of unsaturated and aromatic hydrocarbons. The theoretical yield is 780 grams. Fischer states that the theory of the process is that the contacts used absorb carbon by formation of carbides. The latter richer than Me_2C are temporarily formed and are split up into higher hydrocarbons by the hydrogen mixed with CO.

English patent No. 255,818, issued to Fischer and Tropsch, June 27, 1927, covers a process for the production of paraffin hydrocarbons with more than one carbon atom (ethane and higher) from gases containing oxides of carbon and hydrogen. In an example cited by the inventors they use a mixture of zinc oxide and finely divided iron.

At the present time there is no likelihood that the Fischer-Tropsch synthesized product can compete[28] with petroleum in the United States, but as a brilliant piece of research the work is noteworthy. No large scale steps are being taken in the matter of commercially exploiting the process.

The Patart Process of Producing Methyl Alcohol

General Georges Patart of France has also worked on the synthesis of methyl alcohol from hydrogen and carbon monoxide. A small plant was built in 1922. High pressure is used and a catalyst. Alcohols, esters and ketones are also produced. If methyl alcohol (methanol) is desired temperatures of 662 to 752 degrees Fahrenheit are employed. For higher alcohols temperatures of 752 to 840 degrees Fahrenheit are used. For this synthesis zinc oxide and chromium oxide catalysts are used.

It is stated that one ton of bituminous coal will supply gases from which 880 pounds of methyl alcohol can be obtained and that in France a plant to produce 20 tons of methyl alcohol per day costs $500,000; further, that this substance can be produced in great purity and of theoretical yield.

Manufacture of Hydrogen

A cheap source of hydrogen is essential in the present stage of hydrogenation-cracking work. At the Leuna hydrogenating plant of the I. G. Farbenindustrie, water gas is first made from coke or brown coal semicoke; steam added at high temperature in the presence of a catalyst (usually iron oxide) is disassociated, the hydrogen being added to that already present, and the oxygen converting the carbon monoxide to carbon dioxide, which is washed out. By another method hydrogen is separated by rectification from coke oven gases, of which it forms about 50 per cent.

Hydrogen can be prepared cheaply by electrolysis of water if cheap water power is available. A large amount of hydrogen is available from ordinary cracking units and in a large refinery where a large number of cracking units are operating the hydrogen can be separated from the other cracked gases, to form a considerable supply for hydrogenation-cracking work. A considerable amount of hydrogen for hydrogenating fats is made on the continent by the Linde-Caro process, wherein water gas is liquefied and the hydrogen separated from the carbon monoxide by fractional distillation at low temperatures.

Krauch[29] uses the well known reactions

$$CH_4+H_2O=CO+3H_2—51 \text{ calories}$$

and

$$CO+H_2O=CO_2+H_2$$

to produce hydrogen from methane, and by the use of suitable catalysts claims to have markedly reduced the heat input necessary for the reaction.

[27]Lecture before Coal Conference at Carnegie Inst. of Technology, Pittsburgh, Pa., Nov., 1928. (Second International Bituminous Coal Conference).

[28]However, it is true that those interested in other going industries in the past did not foresee synthesized indigo, or ammonia or methyl alcohol or any one of scores of other synthetic products that slipped in and upset traditional ways of doing things.

[29]Second Bituminous Coal Conference, Pittsburgh, Pa., November, 1928.

USE OF MAGNETOMETER IN THE OIL FIELD

(Continued from Page 150)

suitable rules graduated to one one-hundredth of a mile.

When measuring distances by means of the pedometer or speedometer it will be advisable to first check their accuracy, and if a constant error is observed, apply the necessary correction to all subsequent work. Distances measured by means of the pedometer, due to inherent defects in its principle of operation, should be used with caution. However, speedometer measurements, with proper care, may be made with considerable accuracy. There are three principal sources of error to be considered in connection with the ordinary type of speedometer as applied to the automobile; the total error, very fortunately, being relatively small with high grade instruments. These three errors are: 1. Mechanical defects in the speedometer proper; 2. "Creepage effect" due to the variable slip between rear tires and the road surface; 3. Improper inflation of the rear tires. A properly designed instrument should be entirely free of mechanical defects, while the creepage effect of the rear tires is practically negligible under average road conditions. The error introduced by improper inflation of the rear tires is graphically illustrated in Figure 3. This curve which is fairly typical for the type cars that are extensively used for this service, shows that a greater error, in the speedometer reading, is caused by under-inflation than over-inflation; and under-inflation of 20 pounds resulting in an error of approximately 3.0 per cent, while a corresponding over-inflation causes a little less than 1.0 per cent error. The numerical value of this error would naturally vary somewhat with the weight of the car and also with the size and weight of the tires employed.

In speedometer-Brunton measurements, the speedometer trip scale should not, as a rule, be reset to zero each time the horizontal angle of travel changes, but should preferably be allowed to record continuously, the net distance traveled being computed by subtraction. This is for the reason that it is difficult to accurately reset the trip scale to zero and also because many speedometers do not begin to record, on the trip mileage scale, until a considrable distance has been traveled, in some instances as much as one-tenth mile.

When doing compass work, of this character, it is necessary that the position of at least one point along the line of travel be accurately known. When, at times, the traverse extends between two

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Even the larger sizes, up to and including 12", may be cut and threaded easily and quickly with "TOLEDO" tools operated by a "TOLEDO" Power Drive as shown in this illustration. Pipe is cut with a straight square-end cut without burr and smooth, perfectly tapered threads are produced by the light, compact and portable "TOLEDO" pipe threading and cutting tools.

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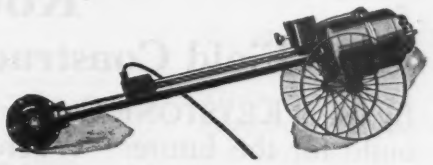

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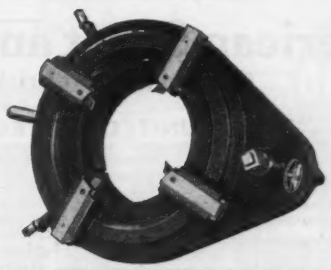

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"TOLEDO" NO. 3 THREADING DEVICE. THREADS 4½" TO 8" PIPE.

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known points it will be found that the results of the compass work, due to slight inaccuracies, fail to check exactly with the final point. Should this failure to close be appreciable, a closure correction should be applied, each station along the traverse being proportionately affected, both in respect to angle as well as distance.

Location of Stations

As a general rule the location of the field stations is discretionary with the instrument crew, though at times, their approximate positions are fixed by the geophysicist in charge of the magnetometer work. Let us analyze, in their respective sequence, the following considerations which influence the selection of these field stations, i. e., accessibility, comprehensive illustration of salient magnetic characteristics, and local magnetic interference.

Accessible locations for the stations will expedite the progress of both the original survey as well as any subsequent rechecking, should this prove desirable. When the work is being accomplished by means of automobiles the stations should be selected as close to the roads as is permissible with regard to vibration, magnetic interference, physical obstructions, etc. Avoid unwelcome thermal effects from setting up in the direct rays of the sun and choose firm ground for the tripod to prevent settling of the instrument after leveling. During the winter months, when the ground is frozen, it will be noticed, at times, that the instrument has a tendency to settle, which is caused by the relative warmth of the metal tips of the tripod legs attained during transportation. If this condition is suspected it is well to check the levels both before and after the observations. The location selected should be on fairly even ground to reduce the possibility of the operator stumbling with the instrument during the setting up and dismantling.

Selecting Base Stations

Especial care should be exercised in the selection of the base stations to facilitate frequent rechecking. If the area to be covered is large it will doubtless prove advisable to use several bases, their relative anomalies being accurately established before commencing the survey. These locations should be protected from the direct effect of the sun throughout the entire day. Avoid setting up the instrument too close to large trees because of the vibration of the adjacent ground, due to the effect of air currents on the trees. In every case the locations should be marked by means of a stake, bearing both the station number and the date.

In order to disclose the configuration of the subterranean structure, it is essential that we develop the salient magnetic features. To properly accomplish this it is important to intelligently understand the geologic conditions obtaining within the general area under survey, as well as to possess a theoretical knowledge of the magnetic effects of certain types of magnetized bodies.

Apparently some operators are laboring under the erroneous belief that a magnetic high is almost invariably indicative of a structural high, and that further, the axes of the two are vertically coincident. Unfortunately, this elementary theory is fairly consistently contradicted by experience. When we consider that the interpretation of magnetic anomalies is more involved than either torsion balance or seismograph results, we realize that to correctly establish the correlation existing between the magnetic and structural data we must devote detailed study to the most advantageous arrangement of the station locations.

Reconnaisance Traverses

For reconnaissance traverses the accepted practice is to limit the distance between adjacent stations to from one to three miles, while for detailed work the interval should be reduced to meet the specific requirements. Oftentimes, over a particular area, two traverses are made; one north-south, the other east-west. However, experience indicates that a more comprehensive analysis will result, in the majority of instances, if the two traverses are taken northeast-southwest and northwest-southeast. When only a single traverse is to be made over virgin territory it is recommended that the traverse line extend in a general north-south direction, for the reason that the characteristic polarization of many subsurface features is displayed with greater clarity in this direction. In every case the traverse should be of sufficient length to preclude the possibility of false deductions. Any magnetic irregularities revealed by reconnaissance traverses should be carfully checked by a systematically arranged group of stations. Should the disturbance be a magnetic high or low or a combination of the two, the net of stations must be elaborate enough to precisely define the magnetic axes. Before drawing definite conclusions from the resultant data it is advisable to recheck the most important regions.

Measurements made at stations, influenced by local magnetic interference, merely distort the resultant data and must be eliminated as far as possible. Whenever there is any question of interference, play safe! Among the frequent sources of interference may be mentioned direct current electric lines, buried pipe lines, railroads, wire fences, gravel, magnetized outcrops, buried fragments of metal, and lastly, the operator's car and instrument case.

Direct Current Effects

If the stations are located a sufficient distance from cities and towns no trouble should be experienced from heavy direct current effects, since all modern transmission lines are energized by alternating current. Buried pipe lines can usually be detected by the familiar overhead telephone lines which follow their course. The other sources of potential interference, enumerated above, are readily observable, with the exception of buried metal, and should occasion no trouble if reasonable care is exercised in locating the stations. The presence of buried fragments of metal is only a remote possibility and can usually be detected by the abnormal reading obtained at the station affected.

Figures 4 and 5 illustrate graphically the influence of some of the common sources of magnetic interference encountered in the field. While both the shape and magnitude of these curves will change materially in specific cases, they, nevertheless, furnish general information on the subject. The curves were plotted from data obtained in an area where the normal strength of the vertical field was approximately 50,000 gammas.

Referring to Figure 4, curve "A" illustrates the influence of the magnetometer case (containing three auxiliary magnets), the instrument being on the south side of the case. While the shape of the curve changes with the relative position of the auxiliary magnets, the influence disappears, in each instance, at approximately 4 or 5 yards. Curve "B" shows the effect of a railroad, with gravel ballast, running east-west, the instrument being located on the south side of the tracks. This curve reveals the interesting fact that at about 5 yards no distortion of the field is observable. The maximum effect takes place at 9 yards, where the magnetic polarity abruptly reverses, while at 125 yards the influence disappears entirely. The distortion due to a wire fence running north-south, the instrument being on the east side, is represented by curve "C", which indicates that the effect disappears at about 36 yards. Curve "D" illustrates the south half of a north-south traverse across an 8-inch pipe line, buried 4 feet below the surface, the direction of the line being east-west. There is a reversal of polarity at approximately 2 yards, the influence ceasing at 27 yards.

Disturbing Influence

The effect produced by a change in the relative position of the disturbing influence, which in this case was an automobile, is shown in Figure 5. The similarity of the curves is at once apparent; the effect at 2 yards being a maximum when the instrument is north of the car and a minimum when the instrument is south, while the disturbance distance varies from approximately 20 yards, when

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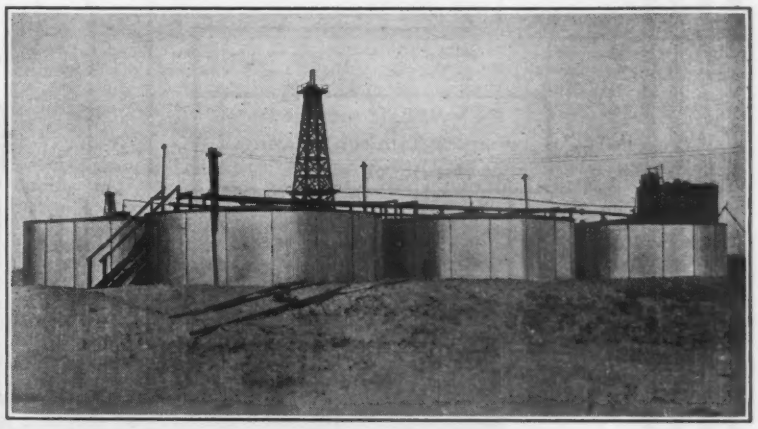

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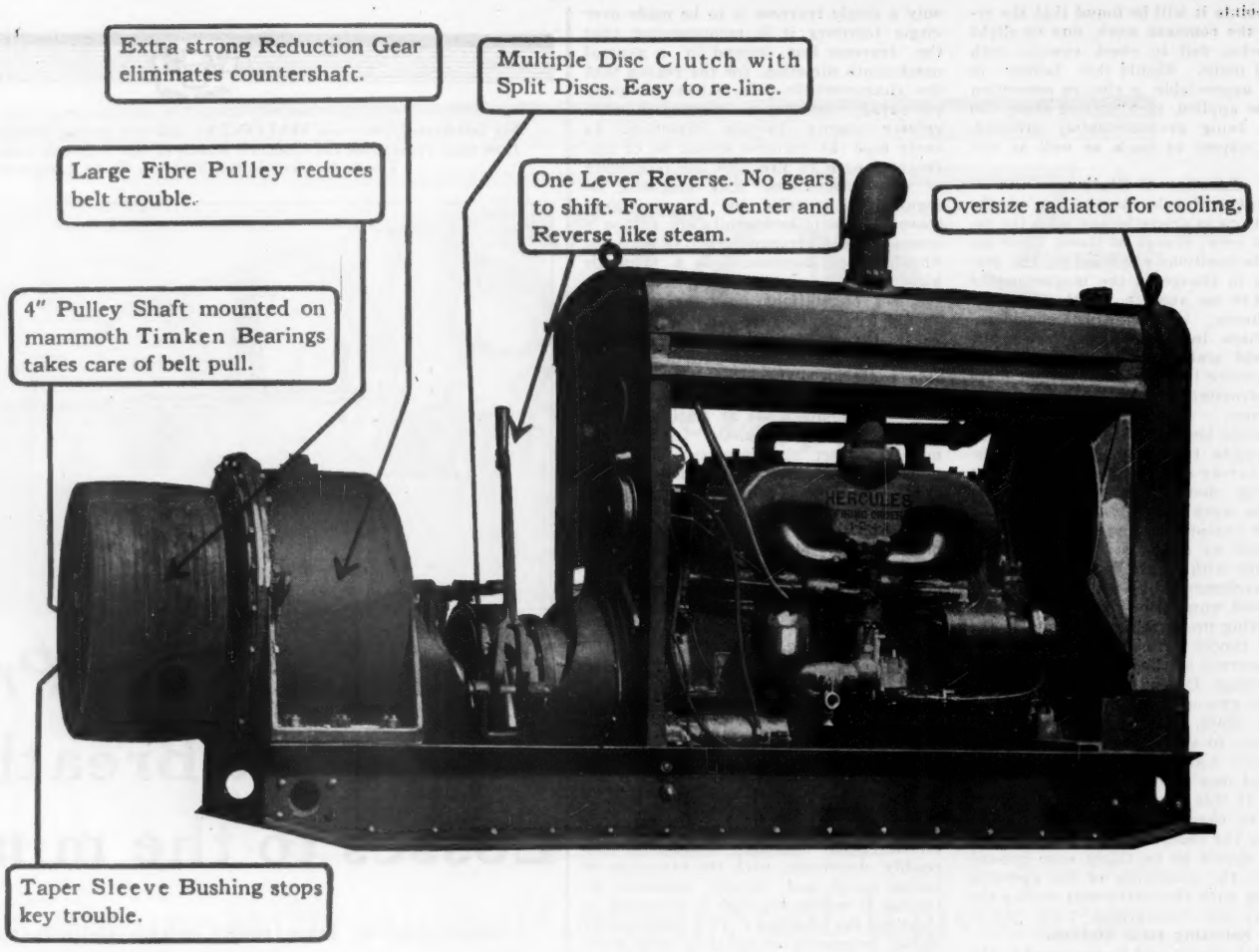
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the instrument is north, to 33 yards when the instrument is west of the car.

There is one important conclusion that can be derived from a study of Figures 4 and 5, i.e., that with reasonable care in choosing the station locations there is no excuse, under ordinary conditions, for local interference to vitiate the field observations. Two possible exceptions to this statement might be mentioned. Magnetometer data obtained in certain areas, due to the presence of highly magnetized rocks immediately beneath the surface, render an entirely false representation of the subsurface structure, and no amount of care in the selection of stations will correct the anomalies caused by the disturbing influence. Also it is extremely difficult to secure authentic magnetic data on producing structures due to the presence of well casings. The vertical lines of force are concentrated in the immediate vicinity of the metallic casing, causing a corresponding weakening of the vertical field in the region adjacent to the casing. Thus, if there is a large amount of this steel present, a survey might reveal a magnetic low covering the central portion of the structure, while in reality a magnetic high might be indicated if the steel were absent.

Instrument Set Up

In many cases two men are used for the operation of each magnetometer. When this is true, one man should be selected to always read the instrument. The instrument man should carry the tripod, while his assistant should have charge of the magnetometer case and field data book. Preliminary to a set of observations, the operator may thus be engaged in leveling the tripod head while his assistant unpacks the instrument and furnishes the compass. If an auxiliary magnet is being employed its position should be carefully checked at each station. It is also well to note the position of the knurled screw which clamps the auxiliary magnet sleeve to the tripod head, for this screw will make contact with the casting which supports the tripod head if the leveling screws are turned too far in, thus preventing the rotation of the tripod head during the subsequent operation of leveling the instrument.

In reading the compass it is advisable that the operator always stand in about the same position, relative to the tripod, readings always being taken on the same end of the compass needle. It will sometimes be found, especially in cold weather, that the compass needle will cling to the glass cover, due to the fact that the glass has become electrostatically charged. Occasionally this charge may be quickly dissipated by bringing the compass case in contact with the earth. The degree of care necessary in determining the proper azimuth of the tripod head may be seen from an inspection of Figure 6. This curve was obtained with an instrument having a scale value of 24.8 gammas, the vertical intensity being 49.737 gammas. It will be noticed from this curve that an error of approximately one-half degree in orienting the tripod head introduces an error of 0.10 scale division. Since it is possible to read the azimuth scale to within about 0.2 degrees, it will be seen that the probable error in the instrument reading should not exceed 0.05 scale division.

Leveling the Magnetometer

The proper orientation of the tripod head being completed, and its position recorded, the instrument is attached by means of the friction plates, care being exercised to first remove any foreign particles from the base of the instrument and the tripod head. In leveling the magnetometer, by means of the tube levels, the mean of the two ends of the level bubble should be observed, the instrument being leveled to within one-half a division of the scale on both levels. Some trouble has been experienced with the tube levels due to the temperature effect of the wind on the glass tubes. This difficulty may be readily overcome by constructing a shield of light sheet brass or aluminum, or even cardboard, which will completely surround the level assembly, and of a height which will not interfere with the lateral mirror. This shield may be painted to conform with the instrument housing and left permanently attached.

The operation of leveling being completed the instrument is returned to the proper azimuth and the deflection and time observed, after which it is rotated 180 degrees with magnetic system locked, and the deflection readings repeated. The number of observations required, in each azimuth, depends largely upon the behavior of the instrument. Two readings, in each position, are probably sufficient if the instrument is functioning properly, though it is recommended that at least three sets of observations be recorded at each base position. Failure of the magnetometer to closely agree on subsequent readings is evidence of a damaged bearing or knife edge, dust on the bearings, magnetic interference due to ferruginous articles about the person of the operator, magnetic "Strays" caused by D.C. currents, and occasionally to magnetic storms. It will sometimes be noticed that this failure to repeat is caused by an improper adjustment of the arresting pins which engage the magnetic system, thus permitting the relative position of the knife edge and bearings to change. When arresting the magnetic system the arresting lever should be rotated to its final position, or the position marked "fest," as this insures, if the adjustments are correct, the accurate centering of the arresting pins. This is mentioned in view of the fact that certain operators, in order to save time, merely deflect the magnetic system with the arresting lever without lifting it entirely from the bearings.

Position of Operator

Allow me at this point to stress a few simple remarks. Always stand in the same relative position while reading the magnetometer; preferably at the thermometer side of the instrument, the arresting mechanism being operated with the left hand. This practice should obviate the possibility of reading the instrument backwards. Always adjust the lateral mirror and focus the ocular so that the scale is well lighted and distinct, thereby minimizing the probable error in reading. Always be certain that you have no magnetized articles about your person. Always require your assistant to repeat the readings, after you have called them out, to insure the accuracy of the recorded data. Always be sure that the arresting lever is locked in position at the conclusion of the observations. Always remember the cost of the magnetometer and handle it accordingly.

The reader will, no doubt, have noticed that no mention has been made regarding the temperature reading. The customary practice is to note the temperature, both before and after the series of deflection observations, and from these two values compute the mean temperature. Also, some operators habitually record only one temperature reading, which is taken, with the time, between the deflection observations. There is a persistent doubt in the writer's mind concerning the degree of accuracy obtaining with either of these methods.

Temperature Lag

Under ordinary conditions the temperature, as read by the thermometer, changes during a set of observations; this change, at times, amounting to several degrees. The inherent characteristic of temperature lag prevents the magnetic system from quickly following these abrupt fluctuations, so that, although the thermometer indicates an appreciable difference in temperature, the deflection of the magnetic system fails to change by a discernible amount. The most logical procedure would be to set the instrument up and allow it to stand for a sufficient length of time, before reading, to insure a uniformity of temperature to exist between the thermometer and the magnetic system. Unfortunately, the requirements of time prohibit this method.

From the above considerations it appears that the temperature reading should be observed only once for each station;

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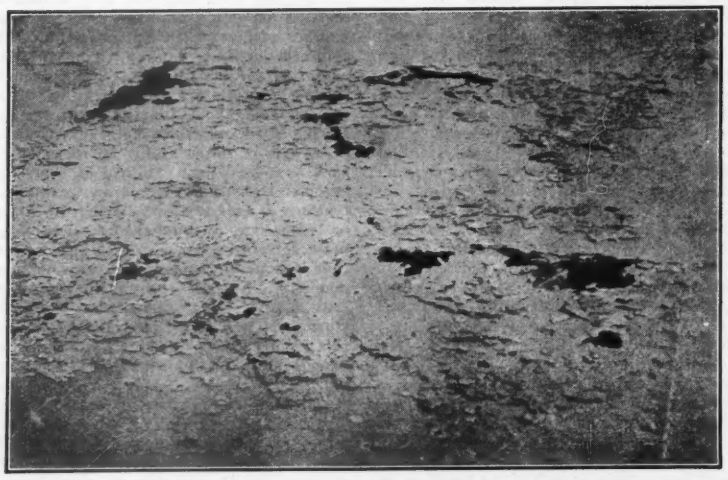

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immediately after setting up the instrument and prior to the operation of leveling. At this time, it is probable, the temperature of the thermometer and the magnetic system will be in close agreement, due to the fairly uniform temperature condition of the carrying case, during transportation between stations.

Corrections

The reduced reading at a particular station, expressed in gammas, is obtained by applying to the product of the mean deflection and the instrument scale-value, the following list of well-known corrections, i.e., (a) temperature, (b) auxiliary magnet, if required, (c) regional, (d) diurnal, (e) base.

(a) and (b) The temperature correction and auxiliary magnet correction are so well understood as to require no further enlargement. However, let us briefly consider the three latter corrections, i.e., regional, diurnal and base.

(c) The correction for regional variation is applied to compensate for the normal change in the vertical intensity, of the earth's magnetic field, with latitude and longitude. The amount of this correction may be determined from a study of the vertical intensity magnetic chart published by the United States Coast and Geodetic Survey. The chart showing the plotted values of the vertical intensity, at each county seat, is preferable to the contoured chart, of 1,000 gammas interval, since this latter map is entirely too general to furnish the required correction data.

It is not uncommon for operators, in computing the corrections for regional variation, to entirely ignore the longitude correction. However, for a proper analysis of the results, it is essential that this correction be considered; unless, as it sometimes happens, the isomagnetic lines run exactly east-west.

This correction for latitude and longiture, having been once determined for a general area, should be allowed to remain unchanged, since altering its numerical value would serve to obscure the correlation existing between adjacent surveys.

(d) The magnetometer operator is rather familiar with the periodic variations in the earth's magnetic field, known as the diurnal variation. The amplitude of this somewhat regular fluctuation appears to be intimately associated with the position of the sun above the horizon and to a lesser extent, upon the position of the sun with respect to the earth in its daily rotation about its axis. The diurnal variation, which is principally a local phenomenon, attains, at times, considerable magnitude, resulting in magnetic storms, which may last only several hours or may cover a period of days. Magnetometer work must be suspended during these storms, which occur at irregular intervals and often accompany large sun spots and auroral displays. It is a significant fact that they occur almost simultaneously over the entire surface of the earth. By special arrangement with the director of the nearest magnetic observatory, telegraphic advisement of the progress of these storms may be had, so that the magnetometer work may be discontinued until the magnetic element resumes a more stable condition.

Diurnal Variation

Figure 7 illustrates graphically the phenomenon of diurnal variation, these curves being reproduced through the courtesy of the United States Coast and Geodetic Survey. They indicate the variation of vertical intensity for four of the magnetic observatories of this bureau, based on the average of several years' observations. It will be noticed that the curves for January, February, November and December are of the same general character, while the same applies to the curves for March, April, September and October and those for May, June, July and August. It will be observed that each curve indicates a well defined minimum about noon. They further show that the principal changes occur during the daytime, the fluctuations at night being small. It should be understood that these curves are based on average values and that for an individual day there may be considerable departure from this average.

To obtain the net anomaly between the various stations of a magnetic survey it is necessary to compensate for this continual change in the magnetic element. This may be accomplished in a number of ways. The vertical intensity magnetogram of an observatory will serve the purpose if the observatory is not too far removed from the area under survey. Also, the fluctuation may be observed by means of a second variometer, either visually or by employing a photographic recording attachment. A third method, and decidedly the most popular, consists in repeating the base position at periodic intervals throughout the day, thereby determining the effect of the diurnal variation. From the data thus obtained a diurnal variation correction curve is drawn, from which curve it is possible to obtain the appropriate correction applying to each individual station during the day's work. It must be remembered that the variation and the corresponding correction are of opposite signs. This method also possesses the additional merit of furnishing a continual check on the accuracy of the instrument temperature coefficient.

Base Repetitions

The number of base repetitions required, per day, to determine with fair fidelity the diurnal variation is a much discussed question. The desired accuracy of the survey should prove the determining factor. The observatory curves, mentioned above, would indicate the advisability of repeating the base station, to meet ordinary requirements, three times per day: at the commencement of work in the morning, at noon and upon completion of the day's work in the afternoon.

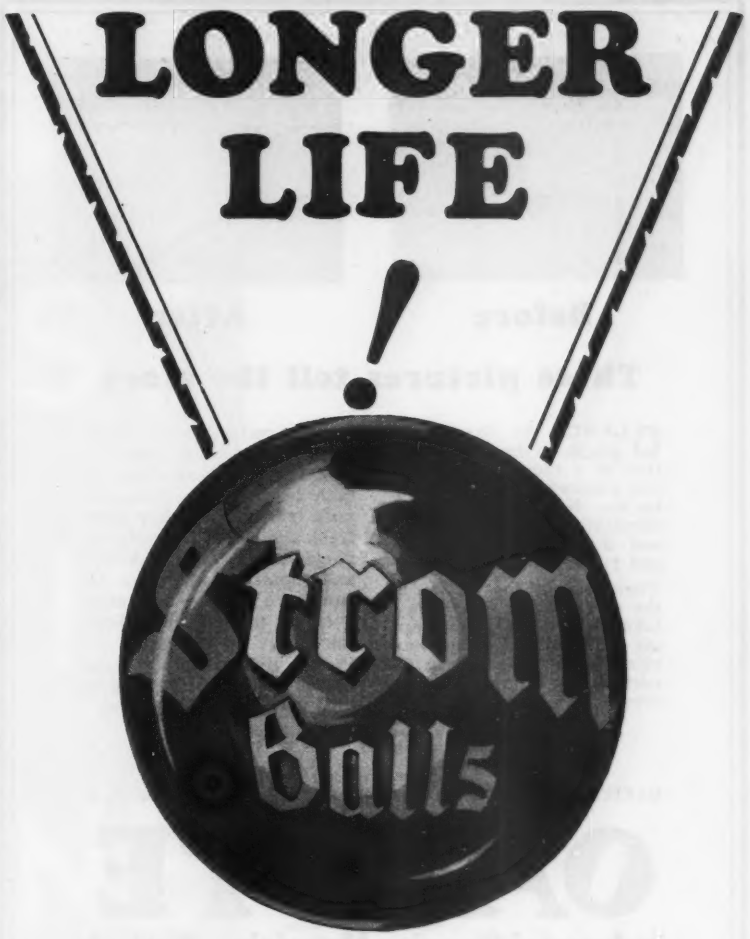
(e) The base correction is required to point out any irregularities in the behavior of the magnetometer caused by inaccuracies in the temperature coefficient, displacement of the center of gravity of the magnetic system, caused by severe shocks, etc. This correction compensates for changes in reading at the same station, if repeated, when these changes are not traceable to the influence of diurnal variation.

Since, as pointed out above, the general practice is to determine the diurnal variation by repeated readings at a base position, we may disregard the base correction as constituting a separate correction, and consider the combination of the diurnal variation and the base correction as a single quantity, termed the closure correction. We may thus construct a curve, based upon the base station readings, which will graphically indicate the closure correction to be applied to each particular station throughout the day's work.

Computation of Data

The task of working up the field data becomes at time laborious and any short cut which will facilitate the computations is to be invited. The speed of the calculations may be increased by the judicious use of the slide rule, the 20-inch rule, of either single or double graduations, being especially recommended.

In Figure 8 is shown the front side of a sample data sheet, measuring 8½ by 11 inches, which the writer has found very convenient. It is of a general type that is employed by many operating companies, the cost of printing, in lots of 1,000, being approximately 3 cents per sheet. With this particular form the values are carried forward, in gammas, to the column headed DZ, which indicates the net anomaly of the particular station with respect to the base position within the area under survey. The Net DZ column represents the station anomaly with respect to a general base, to which all of the readings are referred. Concerning the other column headings, dT represents the difference, expressed in degrees, betwen the temperature at a particular station and the temperature at the base, while adT is the product of dT and the instrument temperature correction. Space is provided, under Deflections, for two readings in each azimuth, the average difference between the station and the base, expressed in scale divisions, being entered under dx. KdX represents the product of dX and the instrument scale-value, while dz′ is the sum of adT and KdX. Under



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the heading D.V. are placed the appropriate corrections for diurnal variation, the column dz" showing the sum, in gammas, of dz' and D.V. The heading Reg. indicates the correction for latitude and longitude, while DZ, as mentioned above, expresses the resultant anomaly of the station.

Miscellaneous

In view of the cost and effort entailed in the collections of accurate magnetic field data it is suggested that an adequate method of filing this information be adopted which will insure both safety as well as facilitate reference. The field data sheets, which constitute the principal source of this information, may be filed numerically, space being provided for entering the individual page numbers as illustrated in Figure 8. They may also be grouped with reference to states, counties and township-ranges or blocks, or the results of a complete survey may be filed either numerically or by date. To assist in clarifying the magnetic results of adjacent surveys it is important to have available a general base map, covering a relatively large area, on which the anomaly, with respect to a general base, of each station within the area is placed.

There has been no little comment in the past concerning the probable degree of accuracy to be expected in rechecking stations with the magnetometer. In Figure 10 the writer has tabulated data, concerning this subject, which perhaps will prove of interest.

Seven observations were recorded at a certain base station in northwest Louisiana, where the absolute value of the vertical intensity was 49,595 gammas. The observations covered a period of 44 days, the average time between subsequent readings being approximately one week. From an inspection of the data it will be seen that the minimum variation from the average field intensity is —0.3 gamma, while the maximum variation is —10.8 gammas. The average variation from the arithmetical mean is ±5.0 gammas.

These figures have been included, not in an effort to illustrate the maximum degree of accuracy obtainable in rechecking stations, but rather to point out the probable error to be expected under average field conditions when no effort is made to correct for diurnal variation, and when the temperature corrections involved are somewhat large. However, it might be well to state these observations were made during winter months when the effects of diurnal variation were abnormally small.

Magnetized Objects

A few words concerning magnetized objects about the person of the instrument man. The removal of all such articles from the operator's person is a simple thing of itself, but like many simple things is sometimes ignored, in part. Wrist-watches, belt-buckles, metallic buttons, spectacles, pencil holders, patented pencils, keys, tobacco cans, metal about the boots, etc., constitute potential hazards that must be studiously observed. Some operators make a practice of emptying their pockets of metallic articles at each station before reading the instrument. This procedure is obviously uncertain and should be strictly avoided. A safer plan is to remove all objects, about which any doubt is felt, before the commencement of work, replacing them only after the day's work is completed.

Transportation plays such an important part in magnetometric field measurements that a few remarks in this regard will not be amiss. The requirements of this phase of the work are largely dictated by geographic conditions; many areas, of necessity, being covered on foot. In marsh lands and areas easily accessible by navigable streams, transportation is expedited through the use of motor boats.

Transportation

While special mediums of travel may be employed to meet specific requirements, the great bulk of the magnetometer work is being accomplished by means of the automobile. Careful judgment should be exercised in selecting a car for this purpose for the requirements obtaining in geophysical field work constitute a veritable proving ground for the automobile. Lightness, reasonable speed and a freedom from mechanical imperfections are essential. For magnetometer work a two-passenger closed car is perhaps the wisest choice, the closed feature proving advantageous both from the standpoint of offering additional protection for men and equipment as well as rendering material assistance in maintaining a fairly uniform temperature for the instrument, especially during rigorous weather conditions. It should be fitted and maintained with good tires; its equipment including, among other things, a complete first-aid kit, in case of accident. When the field work is being done without the help of an assistant it is well for the operator to construct a cradle of leather straps, designed to support the magnetometer immediately above and behind the car seat; thus obviating the possibility of the instrument case turning over while traversing rough roads.

It sometimes happens, unfortunately, that while taking a set of readings with the magnetometer an interested, though uninvited, group of rustic spectators will assemble to witness the spectacle of manipulating the instrument. It is probable that this gathering will include the landowner, and it is equally probable that the operator has neglected to secure his permission to set up his equipment. While geophysical work is essentially confidential, there is nothing in its nature which prohibits courtesy; so that on such occasions it behooves the instrument crew to employ patience and diplomacy, thereby meriting the gratitude of those engaged in any subsequent work in the same locality.

The ambition of some magnetometer operators is to discover how many readings, within a day's time, they can record. Remember, in this regard, that 20 stations per day, justifying complete confidence, are preferable to 40 questionable stations. The task of interpreting magnetic data is difficult at best; the instrument crew can materially assist in solving the riddle by furnishing data upon which absolute reliance may be placed.

FIGURE 10

Reading No.	Time	Temp.	Corrected reading scale div.	Variation from mean cor. rdg. scale div.	Variation from mean cor. rdg. gammas
1	2:40	13.1	30.34	+0.16	+4.8
2	12:55	16.7	30.17	—0.01	—0.3
3	5:25	23.2	30.08	—0.10	—3.0
4	10:14	16.2	30.33	+0.15	+4.5
5	1:26	19.6	30.05	—0.13	—3.9
6	4:36	11.3	29.82	—0.36	—10.8
7	10:02	10.5	30.44	+0.26	+7.8

Mean value 30.18

Average variation from the arithmetical mean = ±0.167 s. d.
= ±5.0 gammas

WILDCAT OPERATIONS IN OKLAHOMA

(Descriptions are East and North unless marked otherwise)

(Continued from Page 66)

JACKSON COUNTY

Altus Oil Co.'s No. 1 Northington, NE cor. NE Sec. 4-1-20w .....Shut down 2,020 ft

KINGFISHER COUNTY

Superior Oil Co.'s No. 1 Story, SE cor. Sec. 25-19-5w ....Fishing 6,285 ft.
Galt Brown's No. 1 Wolf, NW SE Sec. 6-16-7w .....Shut down 6,015 ft.

KIOWA COUNTY

Hyde et al's No. 1 Jones, SE cor. Sec. 23-3-18w-50 .....Shut down 490 ft
Merrick Oil Co.'s No. 1 Kelly, NW cor. SE Sec. 20-7-17w..Shut down 1,035 ft
McWharter and others' No. 1 Sherwood, CWL NW NE Sec. 2-5-17w .....Shut down 1,100 ft

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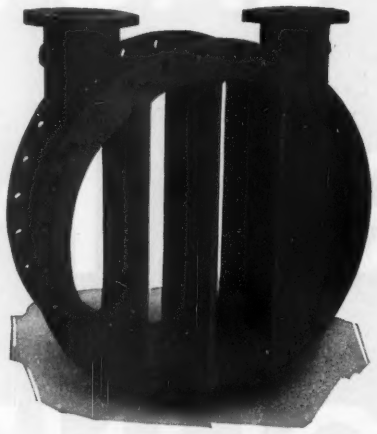

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LEFLORE COUNTY

Red Bank Oil Co.'s No. 1 fee, SE SW NW Sec. 23-9-24 ..Drlg. 4,926 ft.

LATTIMER COUNTY

Limestone O. & G. Co.'s No. 1 Shaw, NW cor. NE NW Sec. 23-5-18e .....Shut down 1,450 ft.
Limestone Oil & Gas Co.'s No. 1 McMurray, SW cor. SW Sec. 15-5-18 .....Sandy lime 3,950-54 ft.; 2,000,000 ft. of gas; pulling big pipe; fishing.

LINCOLN COUNTY

Morgan & Flynn's No. 1 Johnson, SW NE Sec. 1-16-5...Drlg. 730 ft.
Phillips Pet. Co.'s No. 1 Stephens, SE cor. NW Sec. 29-12-3 .....Drlg. 3,960 ft.

LOGAN COUNTY

Haley & Smith's No. 1 Guier, SE cor. SW Sec. 33-18-3w..Shut down 3,970 ft.

McINTOSH COUNTY

Spring Valley Oil Co.'s No. 1 Carr, SE cor. NE NW Sec. 16-10-18e .....Shut down 2,508 ft.
Patterson and others' No. 1 Smith, SW cor. NW SE Sec. 32-9-16 .....Shot 240 qts. 5,446-5,559 ft.; shot went off up hole; fishing

MAJOR COUNTY

Earl and others' No. 1 Turner, C NE NE Sec. 23-20-14w..Rig.

MUSKOGEE COUNTY

Sioux Oil Co.'s No. 1 Unknown, NW SE Sec. 21-11-19 ...Shut down 1,011 ft.
Cooper-Badget's No. 1 Young, NW NE NE Sec. 7-12-20e..Shut down 50 ft.

NOBLE COUNTY

Peerless et al's No. 1 Wentz, NW SW Sec. 22-22-1 .....Drlg. 830 ft.
Gypsy Oil Co.'s No. 1 Bailey, C NE NE Sec. 24-22-1e ..Drlg. 4,930 ft.
Magnolia Petroleum's No. 1 King, C SE SW Sec. 26-20-1w.Drlg. 4,815 ft.

OKFUSKEE COUNTY

Henry Oil Co.'s No. 1 Harjo, Sec. 36-12-9 .....Drlg. 1,175 ft.
Shepard et al's No. 1 Neveas, SE NW SW Sec. 3-12-10 ...Drlg. 2,500 ft.
Superior and others' No. 1 Carolina, SE cor. Sec. 6-11-7e .....Rigging up standard tools 4,805 ft.

OKLAHOMA COUNTY

Ryan & Martin's No. 1 Lawton, NE NW Sec. 3-11-2w ..Rig.
Tom Slick Oil Co.'s No. 1 Martin, C NW NW Sec. 13-13-1w .....Drlg. 5,590 ft.
Mid-Kansas' No. 1 Trosper, NE NW Sec. 19-12-1w .....T. D. 6,904 ft.; P. B. 6,177 ft.; 320 bbls. oil.
Hall & Briscoe's No. 1 Holmes, NE cor. SW SE Sec. 10-11-3w .....Shut down 4,750 ft.

PITTSBURG COUNTY

Galbreath's No. 1 Snyder, C W half SW Sec. 28-4-13 ....Shut down 100 ft.
Empire O. & R. Co.'s No. 1 Williams, C NE SE Sec. 33-7-16e .....Drlg. 1,700 ft.
Kerr & Koy's No. 1 Hall, C NW NW Sec. 32-4-13 .....Shut down 2,580 ft.

PONTOTOC COUNTY

Indian Territory Illuminating Oil Co.'s No. 1 McFarland, NW cor. Sec. 4-5-5 .....Drlg. 2,060-68 ft.; show oil.
Indian Territory Illuminating Oil Co.'s No. 1 Sheats, C NE SE Sec. 1-4-4 .....Location.
Independent and Shaffer's No. 1 Moses, NE SE SW Sec. 19-5-4 .....Drlg. 2,370 ft.

POTTAWATOMIE COUNTY

Prairie O. & G. Co.'s No. 1 Bodkin, SW cor. Sec. 26-8-4...Rig.
Empire O. & R. Co.'s No. 1 McKown, SW NW Sec. 25-8-4 .....Drlg. 3,755 ft.
Keister & Manning's No. 1 Tibbs, NE SW Sec. 9-8-4 ....Drlg. 3,676 ft.
Amerada's No. 1 Vineyard, NW NE NE Sec. 15-7-3 .....Drlg. 4,747 ft.
Gypsy Oil Co.'s No. 1 Randosh, NW NE Sec. 23-6-4 .....Drlg. 2,400 ft.
Frank Moore's No. 1 Fundis, SE NE Sec. 19-7-3 .....Abandoned.
Shaffer and Margay's No. 1 Murphy, NW NE Sec. 11-6-3 .....Fishing csg. 4,632 ft.
Cal-Cul Oil Co.'s No. 1 McKnight, NW cor. NE NW Sec. 9-8-3 .....Rigging up standard tools 4,815 ft.

ROGER MILLS COUNTY

Bucy & Stone's No. 1 Williams, C SW Sec. 23-12-24w ....Rig.
L. C. Hivick's No. 1 Davis, C NW NE Sec. 4-11-26w ....Drlg. 1,800 ft.

SEMINOLE COUNTY

Sunray Oil Co.'s No. 1 Sunday, NW SE Sec. 25-5-5 ....Location.
McCullough Oil Co.'s No. 1 Luckett, NE NW Sec. 28-10-5..Shut down 4,903-10 ft.; water.
Prairie & Slick's No. 1 Bettsey, NW SW Sec. 36-6-6 ....Drlg. 3,215 ft.
Harris' No. 1 Harjocke, SE NE SE Sec. 3-6-6 .....Drlg. 3,390 ft.
Prairie's No. 1 Mingo, NW NE Sec. 25-6-6 .....Drlg. 2,852 ft.

SEQUOYAH COUNTY

Hunt and others' No. 1 Unknown, SE cor. NW SW Sec. 13-13-23 .....Shut down 1,260 ft.
Buffington and others' No. 1 Melcher, C SW NW Sec. 31-12-24 .....Shut down 3,000 ft.

WOODS COUNTY

Peerless O. & G. et al's No. 1 Cromwell, SW SE Sec. 14-28-16w .....Shut down 1,500 ft.
S. K. Miller's No. 1 Copenhavers, NW cor. NW Sec. 18-24-13w .....Rigged up and shut down
Gypsy-Prairie and others' No. 1 Thompson, SE cor. SW Sec. 10-25-15w .....Drlg. 5,888 ft.
Sinclair Oil & Gas Co.'s No. 1 Steward, C SW SW Sec. 33-27-16w .....Drlg. 5,316 ft.

WOODWARD COUNTY

Farrond et al's No. 1 Unknown, SE cor. SW SE Sec. 2-22-17w .....Shut down 1,387 ft.
Prairie Oil & Gas Co. and others' No. 1 James, NE cor. NW Sec. 23-23-17w .....Drlg. 5,370 ft.
Billy's Oil Co.'s No. 1 Watt, C SE Sec. 9-23-20w .....Underreaming 6-in. csg. 4,400 ft.
Burgoyne Brothers' No. 1 Merkins, SW cor. SE NE Sec. 15-21-19w .....Shut down 1,910 ft.

SOUTHERN OKLAHOMA

BRYAN COUNTY

Marshall's No. 2 fee, C SW SE NW Sec. 26-5s-7 .....Shut down 265 ft.
Yale Oil Syndicate's No. 1 Craige, C NW NE Sec. 36-9s-9e .....Shut down 1,316 ft.

CARTER COUNTY

Avon-Dickey's No. 1 Anderson, NE cor. SE NE SE Sec. 32-4s-2 .....Shut down 420 ft.

CHOCTAW COUNTY

Choctaw Petroleum Co.'s No. 1 Wilson, SW cor. SW Sec. 15-6-19e .....Shut down 1,346 ft.

COMANCHE COUNTY

Bridwell Oil Co.'s No. 1 Porter, NE SE SE NW Sec. 17-1-11w .....Dry and abandoned 2,385 ft.

JEFFERSON COUNTY

Danciger et al's No. 1 Dilley, SE NW Sec. 11-5s-7w ....Rigging up to drill deeper
Gypsy Oil Co.'s No. 1 Smith, C SW SE SE Sec. 2-7s-7w..Drlg. 2,640 ft.

JOHNSTON COUNTY

Smith & Knisely's No. 1 Lane, E half Sec. 29-1s-7 ....Drlg. 2,254 ft.

McCURTAIN COUNTY

Utopia Pet. Co.'s No. 1 Unknown, SE NW Sec. 14-9s-25 ..Location.
Milton et al's No. 1 Vase, SW NW Sec. 26-6s-21 .....Shut down 1,490 ft.

MARSHALL COUNTY

Westheimer & Daube's No. 1 Monsenberg, SE SW Sec. 26-7s-5 .....Drlg. 880 ft.

STEPHENS COUNTY

Pandem Oil Co.'s No. 1 Harber, C SE SE Sec. 34-2-9w ..Rig on ground.
Porter & Monahan's No. 1 Robberson, SE NW Sec. 23-3s-4w .....Drlg. 2,720 ft.

TILLMAN COUNTY

Nance et al's No. 1 Massie, NE NW Sec. 36-1s-6w .....Location.
Landfair and others' No. 1 Smith, SE SW SE Sec. 6-2s-16w .....Shut down 2,535 ft.

OKLAHOMA PANHANDLE

Skaer's No. 1 Hitch, NW cor. Sec. 25-1-15e .....Shut down 250 ft.
Stanley-Munday's No. 1 Club Lake, NE NW NW Sec. 31-6s-10e .....Drlg. 660 ft.
Wirt Franklin's No. 1 Bandy, NW cor. Sec. 4-4s-10w ....Rig.
Pace et al's No. 1 Voss, C SE NW SW Sec. 23-2s-7w ....Drlg. 550 ft.
Pace et al's No. 1 Horton, C SE SW SE Sec. 26-2s-7w ...Drlg. 100 ft.
Pace et al's No. 1 Butler, C NW NW SW Sec. 35-2s-7w ..Drlg. 500 ft.

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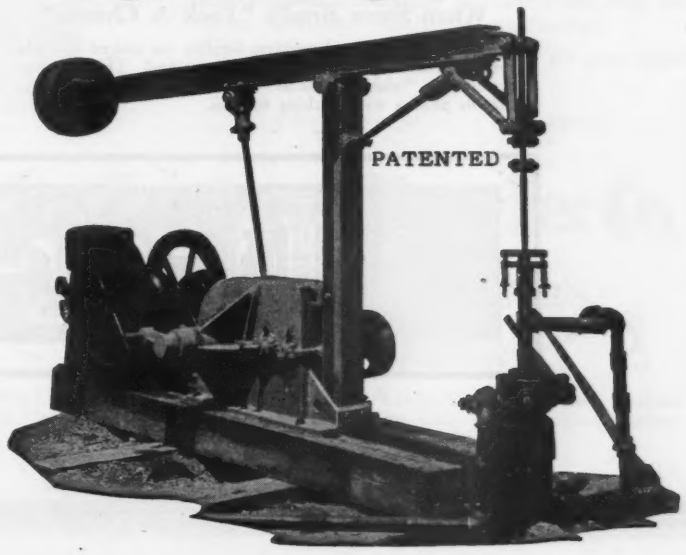

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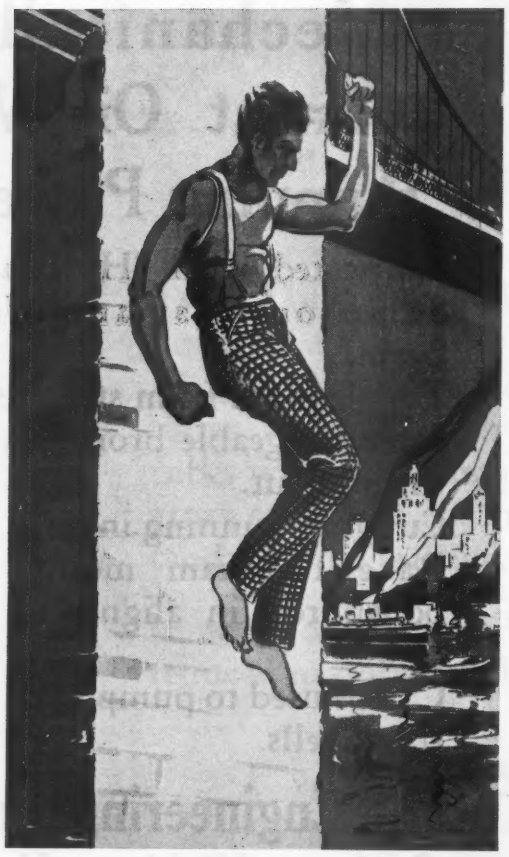

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REGIONAL STRUCTURE IN TEXAS PERMIAN

(Continued from Page 174)

basin to the east, into which the high runs at an angle, and in part to the post-Permian tilting of the Guadalupe Mountain block.

Winkler County Structure

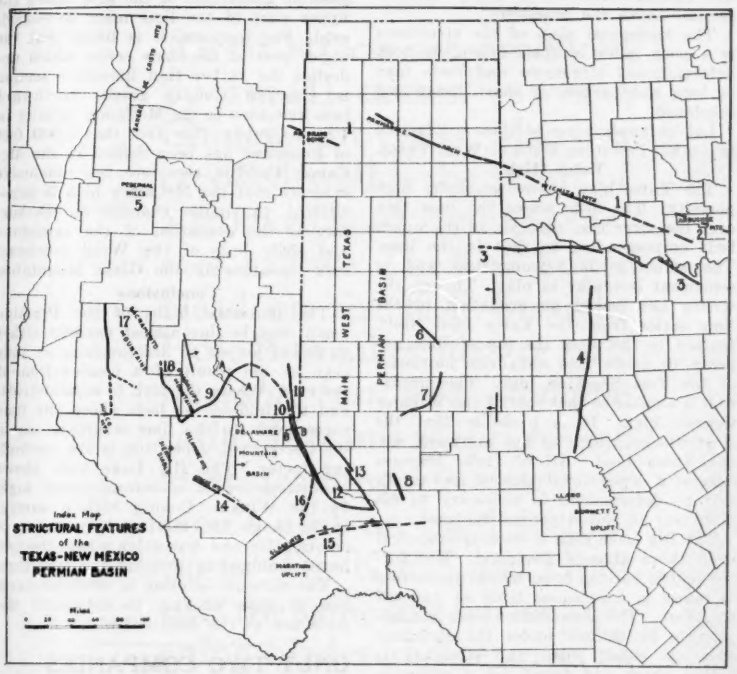
There are at least three distinct fields producing from the lime in Winkler County. They have somewhat different characteristics but the largest one, the Hendricks Pool, shows the same features throughout its length. It differs from the Getty structure, as it is a combination of a depositional high and an anticline due to deformation. (Figure 3, and Nos. 10 and 11, Figure 1.)

This high shows an asymmetrical cross section similar to that of the Getty Pool. The lime, however, does not continue to drop off on the seaward side (in this case to the west) but the top flattens out and it is probable that the reef face is well to the west of the producing arch. As in the case of the Getty Pool the beds above the lime thin over the structure but they are thinnest over the western part of the flank that it is unlikely to produce oil.

Porosity in Lea-Winkler County Area

There is a definite connection between the reef barriers and porosity. Russell Lloyd[2] has pointed out how porosity is formed in the reef itself by dolomitization of the original calcite of the reef. As the sediments grade toward more saline conditions on the shoreward side of the barrier the secondary dolomite grades into primary dolomite and this in turn into anhydrite. Porosity likewise decreases to the eastward until it disappears entirely in the anhydrite. In the Winkler County Field the reef probably lies about 3 miles to the west of production. The porosity diminishes eastward across the field, the steep west flank fortunately being located far enough west to be within the zone of high porosity. Figure 3 shows that there is not sufficient structural closure to account for the accumulation of oil down to nearly 300 feet below sea level (the water level in the field). Eastward gradation into anhydrite gives the closure in that direction.

In southern Lea County, as the reef diverges from the structural high porosity conditions on the latter become poorer. Porosity in the lime itself is probably so



limestone high 2 miles or more west of the axis. The salt series grades laterally from both sides of the high into anhydrite and the greatest percentage of anhydrite is found where the series is thinnest. Figure 3 illustrates how the reef was formed and the beds deposited over it, giving the thinnest section over the reef itself. The whole series was then subjected to deformation which produced the Hendricks fold and moved the axis of the limestone high to the east. The thickening of the salt section to the east accounts for the fact that the present axis of the structure in the salt is far to the east of the axis in the lime.

The age of deformation appears to be post-Triassic, as the base of the Triassic sands follows the Rustler down into the syncline west of the field. This may be one case in which movement of Cretaceous or later age has modified Permian structure near the center of the basin.

The original structure of the Hendricks Pool was probably broader than that of the Getty Pool. Farther to the north in the Leck and Scarborough areas the depositional high and the structural high can still be distinguished but the former is narrower and the compaction fold in the salt above the reef still shows reversal to the east in spite of the fact that the whole lies on the west flank of the deformational fold.

Still farther north the line of the reef diverges from the line of deformation. The former runs northwest whereas the true fold continues to the north. This throws the reef down so far on the west poor on the axis that monoclinal accumulation to the west may be found due entirely to decrease of porosity up dip. Wells from such accumulations cannot be expected to compare with the large wells found in or near the reef limestone itself. The Marland Lockhart and the Empire No. 1 State are examples of the former.

Depositional Theory Applied to Other Limestone Highs

In the foregoing account certain features are suggested as indicating depositional highs while others indicate deformational highs.

Thinning of the salt and red bed section over lime structure is taken to favor the former. Such thinning can best be explained as due to actual differential deposition and differential compaction over a topographic elevation.[3] although the same result can be obtained by a growing anticline or by the sinking of basins around a stationary high. The Panhandle arch is an example of the latter.

Where there is evidence that a high is partly depositional, the correspondence of the axis of the structure in the overlying beds with that in the lime is considered as evidence in favor of its being entirely due to deposition, as it seems unlikely that the depositional high would be located directly over the axis of deformation. It is thought that in such cases as the Getty

[2]E. Russell Lloyd, op. cit.

[3]Nevin, C. M., and Sherrill, R. E., Studies in Differential Compaction. Bulletin A.A. P.G., Vol. 13, pp. 1-23, 1929.

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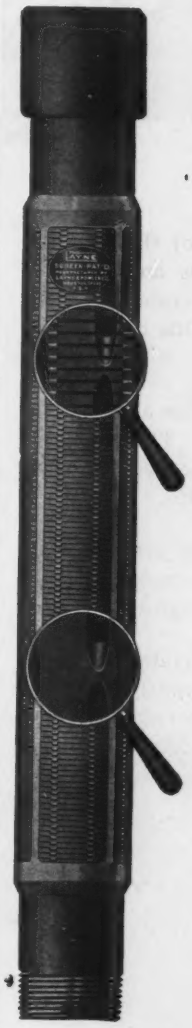

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Pool the original location of the reef was influenced by some structural feature, possibly a terrace on the edge of the basin which was sinking to the east. In Winkler County the area east of the reef may be a positive element which originally located the reef, and later influenced the development of the deformational structure. However, such influence may be regarded as secondary when compared with the magnitude of the known depositional highs.

An asymmetrical cross section likewise suggests but does not prove that a high is depositional.

Gradation of the lime section in the direction of the lesser dip strongly suggests deposition rather than deformation though it is possible for an anticline to form a barrier and cause a gradation toward saline conditions behind it.

Localized porosity is perhaps the best evidence of a depositional high. In the San Adres limestone in the Maljamar and Artesia districts porous horizons can be traced both on and off structure over wide areas. This is in marked contrast to the porosity conditions described in the Winkler County Field. The Artesia and Maljamar Pools, especially the latter, are characterized by a fairly uniform section above the limestone.

The horizontal plan of the structures is a poor index of their origin, as both deformational structures and reefs may be long and narrow or short, broad and echeloned.

Let us apply some of these criteria to two other limestone highs of West Texas.

Yates High

The Yates high shows unusually high porosity. The beds above the lime thin over the structure, the axis in the upper beds corresponding to that in the lime. The structure is asymmetrical and is somewhat irregular in plan. Though the writer has traced no gradation in the lime series from the Yates Pool itself, farther to the west the top of lime appears to grade into anhydrite northeast of the Fort Stockton high. This gradation is similar to that east of the Winkler County high. It is probable that the Fort Stockton high swings eastward into the Yates Pool. All of these features suggest a depositional high of reef origin and no deformation is necessary to explain any of the structural features.

The Big Lake high is more symmetrical than those already discussed. The porous oolitic horizon from which production is found is continuous both on and off structure. The lime section does not appear to be thicker under the structure than on either side. The structure is rather short and broad for a deformational structure but is not unlike the closed domes produced by horizontal displacement and resulting shearing. If any of the limestone highs in the basin are due to deformation this is probably one of them. Additional evidence of this is found in the deep well of the Texon which is producing from sand far below the Permian, indicating that the lower beds are folded on the same axis as that of the limestone high.

Other limestone highs, notably the Howard and Mitchell County high and the Crane and Upton County high, show features of depositional highs, but are located behind the Guadalupian barriers, where the waters were too saline for coral growth. They do not show the extreme porosity conditions of the line of the reefs, and it is thought that they may be due to abnormal deposition of limestone or dolomite along lines of currents or at the mouths of fresh water streams. Each case, however, must be considered on its own merits.

Relation of Depositional Highs to Deformational Highs

Reefs and other forms of depositional barriers are controlled by the depth of the water which in turn governs the location of coral growths and controls currents. The Lea-Winkler County barrier apparently lies on the west flank of a major positive element, as shown by the deformational fold which can be distinguished from the depositional high. The remarkably uniform dip on the west flank of the Delaware Mountain basin is an argument against the presence of any folding due to horizontal compression so that it seems likely that the only deformational forces have been those of vertical uplift and of sinking basins. Exceptions to this statement, of course, include such deformation as the block faulting produced long after Permian time in the Sacramento and Guadalupe Mountains, and the uplift of the Glass Mountains which lies along an old line of folding and does not parallel any of the trends in the basin near it.

Structure Below the Big Lime

Little is known concerning the structure of the beds below the Big lime in West Texas and southeast New Mexico. The ultimate solution of the problem of the limestone high is to be found in the structure of these underlying beds. Where the limestone maintains its thickness both on and off a high, especially in the basin beyond the steep flank, the high may be regarded as due to deformation. The limestone may maintain its thickness on the gentler dip and yet the high may still be depositional. A greater thickness of limestone on the high than in the basin beyond it is conclusive evidence of its depositional origin.

In considering evidence of this nature possible gradations of the beds below the upper part of the lime must be considered. For instance, it is likely that the upper part of the shale series which underlies the rather thin limestone section in Crockett County grades northward into limestone in the McCamey district in Upton County. The fact that 3,000 feet of limestone has been drilled in the McCamey Field is, therefore, not conclusive evidence that the McCamey high is depositional. A similar example on the surface is the gradation of the sandstone and shale beds of the Word northeast into limestone in the Glass Mountains.

Conclusions

The limestone highs of the Permian basin may be due almost entirely either to deposition or to deformation, or they may be the result of a combination of the two. Where the high is asymmetrical and the fold in the beds above the lime corresponds to the lime structure, as in the Getty Pool, deposition is the controlling factor. The Big Lake high shows characteristics of a deformational high. In the Winkler County high a careful study shows the relative importance of deformation and deposition where the two have combined in forming the structure.

The ultimate solution in doubtful cases lies in deep drilling, to determine the structure of the beds below the lime.

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(Continued from Page 170)

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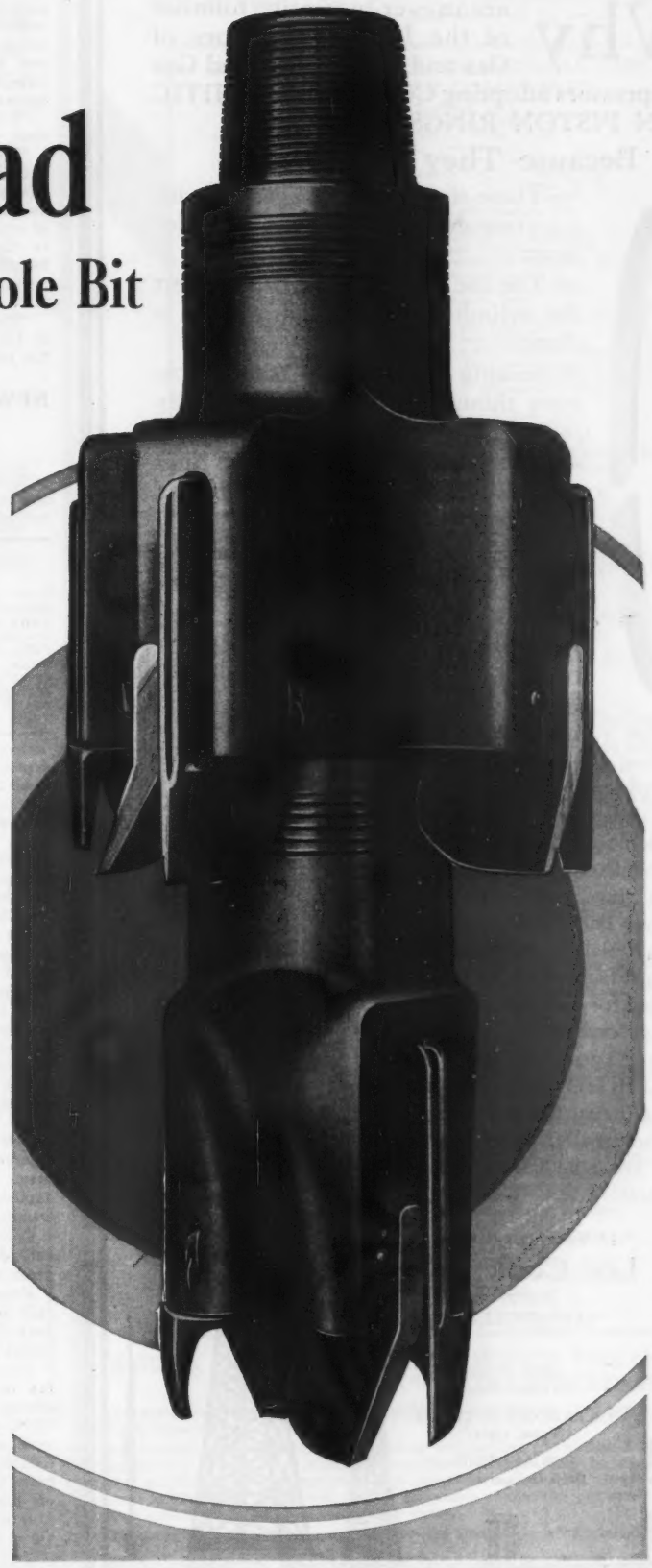

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"Following are data relative to movement of petroleum through the pipe line:

"Total barrels of crude delivered by the Tropical to the Andian in El Centro, for Transportation to Mamonal in 1926, 1927 and 1928, 38,103,103 bbls. Total barrels of crude received in Mamonal from 1926 to the end of 1928, 37,406,921. Total barrels of crude petroleum delivered to barges and tankers during the years 1926, 1927 and 1928, 36,660,249.

"The ministry sold the Andian National Corp. the right previously owned by the nation to 18 hours monthly service."

NEW COLOMBIA OIL LAW OBJECTIONABLE

(Continued from Page 170)

with another person land for exploration and exploitation up to 50,000 hectares but in no case shall any single or legal person exercise in any manner, rights to explore or exploit a total area of more than 100,000 hectares. The Government may allow or refuse to allow such transfers without stating reasons for its refusal.

	Bbls. per day	Percentage
First	10,000	6⅓
Second	10,000	12½
Third	10,000	16½
Fourth	10,000	17½
Fifth	10,000	20
Sixth	10,000	22½
Seventh	10,000	25
Eighth	10,000	27½
Ninth	10,000	30
Tenth	10,000	32½

Every contractor may return upon previous notice to the Government, after the end of the second year of his contract and from year to year during the entire period of exploration, tracts of not less than 5,000 hectares, the length of which tracts must be approximately two and one-half times their width. It will be observed that this requirement respecting the shape of tracts to be returned may prove to be very difficult to comply with and may make it necessary for companies to hold much land regarded as useless for oil production.

In the case of each contract into which the Government enters it will reserve within the same oil zone an equal area. These reserves are to be open to exploration and exploitation by the Government.

Contracts are to run for 30 years and extended for an additional period of 10 years at the election of the contractor.

Exploration contracts are to run for only 5 years and may be extended from year to year up to a period of 5 additional years.

The contractor is to pay an annual tax of 50 cents per hectare in advance during the first two years of the contract, one peso (gold) during the third year one and one-half pesos during the fourth and fifth years and two pesos from the sixth year forward to the end of the contract. Detailed reports of progress made by the contractor are provided for.

Unit Operation

When oil tracts from which oil is being produced are to be developed unit operation between the companies interested must be put into effect. This provision also applies to privately owned land.

On both Government and privately owned land wells must be at a distance of not less than 100 meters from the boundary line and the Government may require that the distance shall be as much as 500 meters.

If a contract should be terminated for any reason the contractor is to leave the wells which may be producing at such time, together with buildings and other immovable property, which shall revert to the Government and movable property of the contractor shall be sold to the Government if so required within 90 days following the termination of the contract. The price is to be fixed by experts.

The law fails to make clear the nature of possession by an oil company of property taken over under contract for exploration and exploitation. Effective possession is to be established after the lease has lasted at least one year by submitting evidence to the Courts. The Government may demand its royalties at the place of production or at the port from which the oil is to be exported and it may demand these royalties in kind or in cash. Ten per cent of the crude produced is required in royalties when such are taken in locations less than 200 kilometers from the sea port, 8 per cent when more than 200 and less than 500 kilometers from the port and 6 per cent when located more than 500 kilometers from the port.

Royalty Provisions

If the Government elects to collect its royalty at the field of production the rate will be 12½ per cent of the petroleum produced.

The Government may also collect its royalty at the field of production in conformity with the following scale:

Total Production	Accumulated Royalty in Bbls.	Percentage of Total
10,000	600	6.00
20,000	1,850	9.25
30,000	3,350	11.16
40,000	5,100	12.75
50,000	7,100	14.20
60,000	9,350	15.58
70,000	11,850	16.90
80,000	14,600	18.25
90,000	17,600	19.55
100,000	20,850	20.85

This table may be prolonged in the same manner for production in excess of 100,000 bbls. per day.

The Government may collect its royalty in cash at the field of production, taking the mercantile price or value of the crude petroleum at the maritime port and deducting the cost of transportation of the same petroleum from the field of production to the respective shipping port.

Royalties on natural gas shall be:

Natural dry gas sold or used for industrial purposes, 5 cents per thousand feet;

Dry gas wasted, 1 cent per thousand feet.

Royalties on natural marketable gasoline, obtained by any process, shall be:

One-thirtieth of the price obtained, in cash, on the basis of ten cents per "standard" American gallon. Should the company obtain a greater price, the amount paid to the Government shall be based thereon.

The above royalties shall be collected after deducting the oil and gas used in the operations of the respective exploitation.

It is understood that the exploiter shall be obligated to preferentially use natural dry gas as fuel and that in no case may he use natural wet gas for this purpose.

The Government is authorized to define in the regulations it issues under this law what is to be understood by "natural dry gases."

If the Government elects to collect its royalty in cash, the price to be paid per barrel shall be determined as follows:

If payment is demanded at the maritime shipping port, there shall be adopted, at the option of the Government, the estimated average price of the same petroleum at the shipping port or in a foreign market which the Government may indicate, in this last case deducting the costs of transportation, calculated in accord with the usual tariffs,

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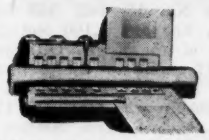
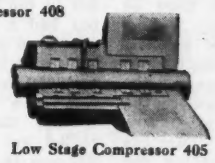


High Stage Compressor 408



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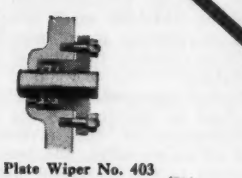
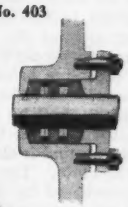


Partition Plate Wiper No. 403



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Sinclair Oil & Gas Co.
The Shell Companies
Standard Gasoline Co.
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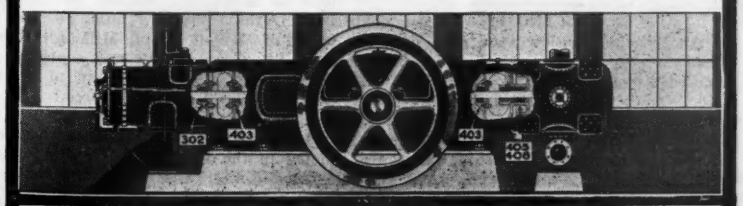
United Fuel Gas Co.
McMan Oil & Gas Co.
Signal Gasoline Co.
Barnsdall Oil Co.
Chestnut & Smith Corp.
Skelly Oil Co.



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Carolina Insurance Co., Wilmington, N. C.
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Citizens Insurance Co., St. Louis, Mo.
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Constitution Underwriters, Springfield, Mass.
Continental Insurance Co., New York, N. Y.
County Fire Insurance Co., Manchester, N. H.
Eagle Star & British Dom. Ins. Co., Ltd., London, Eng.
East & West Insurance Co., New Haven, Conn.
Federal Union Insurance Co., Chicago, Ill.
Fidelity-Phenix Fire Ins. Co., New York, N. Y.
Fire & Marine Underwriters, Hartford, Conn.
Fireman's Fund Ins. Co., San Francisco, Calif.
Firemens Insurance Co., Newark, N. J.
Firemens Underwriters, Newark, N. J.
Franklin Fire Insurance Co., Philadelphia, Pa.
Girard Fire & Marine Ins. Co., Philadelphia, Pa.
Girard Underwriters, Philadelphia, Pa.
Glens Falls Insurance Co., Glens Falls, N. Y.
Great American Ins. Co., New York, N. Y.
Hanover Fire Insurance Co., New York, N. Y.
Harmonia Fire Insurance Co., Buffalo, N. Y.
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New York Underwriters Ins. Co., New York, N. Y.
Niagara Fire Ins. Co., New York, N. Y.
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Phoenix Insurance Co., Hartford, Conn.
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Svea Fire & Life Ins. Co., Gothenburg, Sweden.
Superior Fire Ins. Co., Pittsburgh, Pa.
Travelers Fire Insurance Co., Hartford, Conn.
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AMONG THE PURPOSES FOR WHICH THE OIL INSURANCE ASSOCIATON WAS ORGANIZED ARE:

To enable oil operators to secure sufficient dependable insurance to adequately protect their interests.

To furnish property holders and those controlling oil business expert engineering and inspection service, so methods of insuring this class may be standardized, and efficient fire protective devices installed and properly maintained, thereby stabilizing the business to the point which will enable insurance companies generally to accept the class at fair cost and under equitable policy rates.

To make available the most business-like insurance arrangement for all oil companies.

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from the Colombian shipping port to the foreign market elected.

In the cases in which crude petroleum has no open market or in cases in which there does not exist in the open market a crude petroleum with which it can be compared, the following rule shall be applied: "The prices of two crude petroleum are between themselves in the same relation in which are the sums of the prices of the refined articles obtained from the same petroleum."

Tax on Petroleum

The tax on privately owned petroleum shall be 8, 6 and 4 per cent of the gross production for the first, second and third zones respectively.

Every person or company exploiting petroleum belonging to the state may construct and operate an oil pipe line but the locating of this line must be approved by the Government "taking into account the economic and political interests of the nation". Such pipe lines are to be for the public use and the Government shall have preferential right for the transportation of its petroleum, through such pipe lines as well as private pipe lines paying the tariff in effect at the time of such transportation.

These transportation tariffs are to be fixed by the Government in view of amortization of the invested capital, cost of maintenance, and operation with a profit to the contractor not to exceed 8 per cent of the capital if the company is an independent one, and 6 per cent if the pipe line belongs to a contractor for explorations. The life of every pipe line contract shall be 30 years at the end of which time with the appurtenances fixed to the ground it shall become the property of the state. The movable property may be purchased by the Government.

Transportation companies shall pay a tax of 5 per cent of their gross revenues but this shall not be applied when the petroleum continues in the possession of the same company and it is not retroactive on companies operating prior to the passage of this law.

Regarding Refineries

Refining of crude petroleum is free but the Government may control the location of refineries to keep them away from places in which they would be harmful. The Government itself may construct and operate refineries.

The Government reserves the right to fix the prices at which refined products may be sold to the public by refineries operating on the sea coast.

Certain zones are declared to be a special reserve of the State and only Congress itself can authorize contracts for exploitation and exploration of petroleum in those areas.

CENTRAL WEST FIELDS

(Continued from Page 84)

farm, in the SE, Section 31, Hamilton Township, Sullivan County, at a depth of 860 feet. W. C. Kennedy Co. abandoned No. 4 on the Alex Raley farm, Section 33, Turman Township, same county, and is drilling No. 5 on the same farm.

Siosi Oil Corp. is drilling a wildcat on the W. J. Butt farm, Section 34, Posey Township, Clay County, and George F. Robertson is starting a test in Section 28, Harmony Township, Posey County. Doctor Stinehart is working on the John F. Larkin farm, Section 30, Baker Township, Martin County. Petroleum Exploration Co. is drilling on the R. Howell farm, near Bartlettsville, in Monroe County.

ILLINOIS

Another big shallow sand producer has been found in the old Illinois Field, drilled by John Phipps and others, in No. 8 well, 620 feet from the north line and 200 feet from the east line of the J. W. Clark 90 acres, in the S half SW, Section 2, Dennison Township, Lawrence County, 5 miles south and 2 miles east of Bridgeport, and 7 miles south and 2 miles west of Lawrenceville. The well got its pay in a stray sand at from 599 to 602 feet, and the initial production was 300 bbls., making the outstanding find for some time in the old field, although a few months ago a well on the same farm had the same initial production, indicating this stray sand is very productive. Work is reviving to some extent in the old field. In Dennison Township, same county, the Treat-Hays Oil Co. abandoned No. 1 A. N. Taylor, in the SE cor., Section 11. The Ohio Oil Co. also abandoned No. 8 on the William Gillespie No. 1 farm, same section, and No. 7 on the E. Meagher, Section 5. In Bridgeport Township, Snowden-McSweeney's No. 45 well, 950 feet from the north line and 1,100 feet from the east line of the C. B. O'Donnell, SE, Section 17, same township, pumped an initial of 40 bbls. at 1,301 feet. In the same township, the Ohio Oil Co.'s No. 47 S. N. Cooper farm, Section 5, was dry in the McCloskey sand at 1,809 feet, but had a light showing in the Bridgeport sand and may make a small pumper. This well is 500 feet from the south line and 650 feet from the east line of the farm. In Lawrence Township, same county, the Associated Producers Co. pulled out old Nos. 1 and 2 on the Thomas H. Seed farm, SW, Section 10. They were producers in the Kirkwood sand.

In the Robinson Field, Honey Creek Township, Crawford County, the Silurian Oil Co.'s No. 6 well, 600 feet from the south line and 453 feet from the west line of the Mary E. Liston, NW, Section 3, pumped but 2 bbls. at 1,103 feet. The Ohio and Silurian Oil Co.'s No. 11 M. C. Stentz, Section 29, Oblong Township, same county, produced but 1 bbl. The Ohio Oil Co. is drilling No. 1 on the J. M. Drake, Section 9, and Farnsworth and others abandoned Nos. 1 and 2 on the P. Miller, Section 14, same township. In Prairie Township, Crawford County, Frank Allison and others' test, 1,500 feet from the south line and 650 feet from the east line of the William Akerman, NW, Section 1, pumped but 1 bbl. at 1,065 feet. One-Sixth Oil Co. is drilling No. 4 W. E. Evans, Section 25, and J. F. Bolinger is drilling on the J. P. Evans, Section 36. In Martin Township, the Ohio Oil Co. abandoned No. 4 C. T. Stewart, Section 23. Ohio Oil and Dinsmoor Oil are drilling on the J. W. Dennis, Section 27, and A. D. Barker and others are drilling No. 1 A. W. Mann, Section 13, same township.

In Clark County, Martinsville Township, the Trenton Rock Oil & Gas Co. found a dry hole in No. 13 on the John S. Carper farm, Section 30, at a depth of 3,008 feet, or through the Trenton Rock formation. Same company is drilling No. 8 on the S. W. McClelland, Section 20, same township.

Allendale Field

In the Allendale Field, Wabash Township, Wabash County, the Ridge Farm Oil & Gas Co.'s second test, 600 feet from the south line and 200 feet from the east line of the C. E. Gilliatt, NE, Section 14, produced an initial of 65 bbls. from the Biehl sand from 1,476-94 feet. Same company abandoned No. 6 on the William Price, SW, Section 14. Adams Corner Oil Co. also abandoned No. 12 M. Madden, SE, Section 6, and J. S. Young, Jr., and others pulled out No. 1 M. V. Sturgin, NE, Section 12, all in Wabash Township.

In Jefferson County, Grand Prairie Township, Winter Brothers & Morrow's wildcat in the southeast corner of the Alta Patton, NE, Section 1, was a dry hole at 838 feet.

Timberlake and others drilled a dry hole in a wildcat venture on the William Dorham farm, a mile west of the town of Millstadt, in Millstadt Township, St. Clair County and south of the Dupo Field. The well went to a total depth of 950 feet.

Dupo Wells

A few fairly good wells have been completed in the Dupo Field, in Sugar Loaf Township, St. Clair County, south of East St. Louis.

Joseph Mays' initial test near the southeast corner of the John Lutton farm, SE NE, Section 17, Sugar Loaf Township, St. Clair County, was dry at

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DO you remember the costly delays and fishing jobs caused by broken jars of the old type? The jars that failed at the welds?

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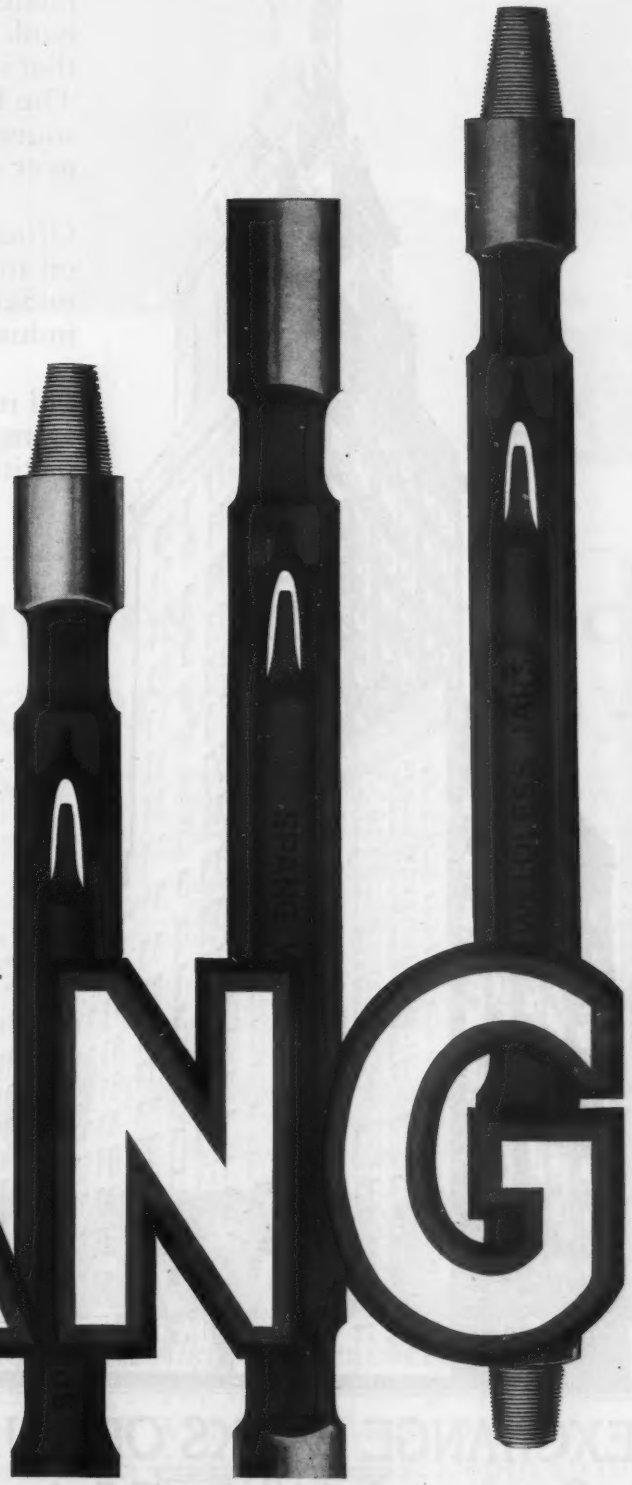

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Back in 1910, when oil was almost an unknown and certainly a most unstable commercial product, a group of pioneer oil producers conceived the idea of creating a bank to properly finance the then infant industry. From that idea have grown The Exchange National Bank and The Exchange Trust Company, of Tulsa, with total resources exceeding $75,000,000 and with customers wherever oil and gas are found.

Officered and directed by financiers who are practical oil men, these banks have been enabled to render an understanding service to all branches of the petroleum industry.

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EXCHANGE BANKS OF TULSA

The Exchange National Bank — Exchange Trust Company

Visitors Always Find a Hearty Welcome Awaiting Them Here

a depth of 545 feet, and No. 3 was also dry at 537 feet and was in the southwest corner of the farm. St. Clair Oil & Gas Co. abandoned its No. 1 well, 1,780 feet from the south line and 200 feet from the west line of the Fred Mettler farm, SE, Section 34, same township, as a dry hole at from 758 to 798 feet. The well showed for a very small producer when drilled into the sand. In the same field, the Ohio Oil Co.'s No. 3 in the northwest corner of the Hall & Weihl farm, NW NE, Section 28, pumped an initial of 65 bbls. from 469 to 535 feet. Same company's No. 13 on the Matilda Dyroff farm, NW, Section 28, produced an initial of 80 bbls. from 522 to 568 feet, and No. 14 produced an initial of 60 bbls. from 503 to 552 feet. Otto Karb's No. 1 Mable Fitzimmons, Lots 4 and 5, Dupo, produced 25 bbls. initial at from 501 to 544 feet. Ostos Pogue and others' No. 1 Mabel Glazier, Lot 5, Dupo, pumped an initial of 30 bbls. from 504 to 543 feet. Hans Wolf's No. 2 Oliver Anderline farm, NE, Section 33, Sugar Loaf Township, pumped an initial of 85 bbls. from 694 to 737 feet. Delaney and others' No. 1 H. A. Stroud lot, Linedman Addition to Dupo, Section 17, pumped 35 bbls. initial from 509 to 534 feet.

CENTRAL OHIO

Thirty-one completions were reported from the Central Ohio fields since the last review, of which 10 were producers with an initial production of 167 bbls., 5 dry holes and 16 gas wells. New work started at 22 new locations and 28 wells started spudding, an initial in new work of 50, being the largest new work week for a long period and indicating the oil and gas operators are anxious to get as many wells hooked to the lines as possible before cold weather comes.

In Ashland County, Orange Township, the Ohio Fuel Gas Co. got a dry hole in No. 1-4775 J. E. Laughery farm, Section 32, as no sand was tapped by the drill. Same company is drilling No. 1-4754 Arlo Stiner farm, Section 26, and also drilling No. 1-4853 Hiram Ewing farm, Section 33. Same company made a location for No. 2-4877 on the Esther M. Irwin farm, Section 28. The Kemrow Co. made a location for No. 3 on the Ben Evil farm, Section 29, which will rig up within a few days. In Mohican Township, the Ohio Fuel Gas Co.'s No. 1-805 Zena W. Seibert farm, Section 34, is reported good for 3 bbls. Same company is drilling No. 1-4804 Alva Shriner, Section 1, Montgomery Township. The Kemrow Co. found a dry hole in No. 1 C. W. Hiner, same section, finding no sand and made a location for No. 1 C. L. Arnholt, Section 6, same township, also started the drill at No. 1 John Heschler farm, Section 1, Milton Township. Garn-Woodward Oil Co. is drilling on the Samuel Starcher, Section 32, Perry Township.

In Medina County, Homer Township, Harmon & George are drilling on the Schott Brothers farm, Section 5. Ohio Fuel Gas Co. made a location for No. 1-4885 on the Frank L. Lytle farm, Section 6, Brunswick Township, and is drilling No. 1-4834 on the Sidney J. Cady farm, Section 11, Medina Township.

In Lorain County, Carlisle Township, the Ohio Fuel Gas Co. brought in a fairly good gas well in No. 1-4776 Andrew Steidl, Section 22, and made locations for No. 2-4870, No. 3-4871 and No. 4-4876 on the Julia A. Clark farm, Section 13. Wiser Oil Co. is drilling No. 3 J. C. Palmer, Section 14. In Grafton Township, Ohio Fuel Gas Co. made location for No. 1-4884 Andrew Bishop farm, Lot 47.

Wayne County

In Wayne County, Congress Township, the Ohio Fuel Gas Co.'s No. 2-3628 C. J. Warner heirs farm, Section 28, is a good gas producer, and the same company made a location for No. 1-4886 William Gessner farm, Section 1. In Chester Township, the same company made a location for No. 1-4887 on the John Myers, Section 18, and drilled a dry hole in No. 1-4757, on the Sam C. Martin, Section 13, where a broken sand was found. B. Slagel is drilling No. 3, George Mark farm, Section 36. Ohio Oil Co. is drilling No. 5 W. M. Orr, Section 21, Wooster Township.

In Holmes County, Homan and others are drilling No. 4 Rose Willard farm, Section 15, Ripley Township. East Ohio Gas Co. is drilling No. 1 C. S. Brown, Section 7, Richland Township, also No. 3 A. E. Harford, Section 14. Same company is drilling No. 1 W. S. Pyers, Lot 37, Hardy Township.

In Richland County, the Ohio Fuel Gas Co. made a location for No. 14,883 on the Sarah McFarland farm, Sections 27 and 28, Monroe Township.

In Knox County, Brown Township, the Ohio Fuel Gas Co. brought in a very nice gas well in No. 5-4756 Elmer D. Pryor farm, Section 3, and made a location for No. 3-4879 on the Rose Pryor, Section 3. Same company drilled an average sized gas well in No. 1-3588 Goldie Robeson, Section 16, Jefferson Township, and started the drill at No. 1-3623 Justin Durbin, Section 21, and made a location for No. 1-4878 on the J. R. Walton, Section 15, same township. Upham Gas Co. is drilling a test on the James Davis, Section 6, Monroe Township, same County.

In Coshocton County, Clark Township, the Ohio Oil Co.'s No. 12 Daniel Fair, Section 6, produced an initial of 25 bbls. from 3,482-3,540 feet. Bell Brothers have a light gas well on the French Allen farm, in Newcastle Township, from a depth of 731-738 feet. Same parties made a location on the John Hall, Section 9, Tuscarawas Township, same county.

Summitt County

In Summitt County, Franklin Township, F. A. Brendall and others brought in an exceptionally good gas well in a second test on the William H. Habel, Section 36, at from 4,114-47 feet. East Ohio Gas Co. is drilling on the Jennie Bolander, Section 23, same township. In Greene Township, F. A. Brendall and others are drilling on the Frank Selzer, Section 7, and also on the A. Wise, Section 19.

In Licking County, Franklin Township, Vaughn & Southern have a 3-bbl. pumper in No. 7 on the Dora Dustheimer, Section 6, from a shallow sand from 715-23 feet. Bishop, Deetry and others are drilling a second well on the George E. Cotterman, Section 11, same township. H. C. Farmer is drilling on the Bernard Warsel, Section 7, Perry Township, and the Whitehill Oil Co. has a fair gas well in No. 5 J. C. Burkholder farm, Section 3, same township. North Fork Oil Co.'s No. 8 John C. Williams farm, Section 3, Hanover Township, reported good for 3 bbls. from 697-708 feet. Everette Gas Co. is drilling No. 2 Dan O. Flenner, Section 7, same township. The Pure Oil Co.'s No. 3 J. E. Eastworthy, Section 1, Hopewell Township, pumped 36 bbls. from 3,048-86 feet.

In Muskingum County, Falls Township, the Athey Drilling Co. has a fair gas well on the John Blair farm, Section 4, from 3,641-85 feet. Same company found a fair gas well on the Maud Shephard and others farm, Lot 25, Union Township, from 743-46 feet. In Perry Township, the Mid-East Oil Co. found a dry hole in the Clinton lime on the C. H. Tom farm, Section 16, from 4,001-41 feet. Wittmer Properties, Trustees' test on the John Cullins farm, Section 8, is reported at 2 bbls. In this well the Niagara lime was found from 2,808-2,923 feet; sand shell with oil showing from 4,077-78 feet; Clinton lime 4,109-49 feet; stray sand from 4,213-20 feet; total depth 4,222 feet. Longfellow and others are starting on the L. B. Jackson, Section 12, same township. Heisey Gas Co. made a location on the John G. Sidle, Section 5, Licking Township. Crowley and others found a fair gas well on the Thomas L. Cunningham, Section 3, Clay Township, from 3,440-70 feet.

In Athens County, Athens Township, Maynard & Ralston's No. 4 Jeff Mansfield farm, Section 19, pumped but 1 bbl. from 1,178-84 feet. Ohio Fuel Gas Co. is drilling No. 1-4826 F. J. Beasley farm, in fractional Section 12, Ames Township. Same company made a loca-

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tion for No. 1-4858 J. P. Lantz, fractional Section 51.

In Meigs County, Sutton Township, Tyree and others' No. 6 Mary Jividen, Section 24, reported at 3 bbls. from the upper Berea sand from 1,779-97 feet. Ket Thompson's test on the Nary Beegle, Section 10, same township, pumped 1 bbl. from the First Cow Run sand from 540-55 feet. Southern Petroleum Co. is drilling a second test on the Peter Karr, Section 11, same township. In Rutland Township, H. McTaggart and others' test on the Thomas Smith farm, Section 24, is an average gas well in the Maxon sand from 702-4 feet. In Scipio Township, same parties have a light gas well in No. 6 Simon & Evans, from 682-705 feet, and a good gas well in No. 1 on the F. C. Holliday, Section 13, also in the Maxon sand from 590-601 feet. Ohio Fuel Gas Co. made a location on the H. E. Bradfield farm, Section 13, same township.

Jackson County

In Jackson County, the Ohio Fuel Gas Co. is drilling No. 1-3512 E. C. Chapman farm, Section 22, Franklin Township, and made a location for No. 2-4868 George W. Vanfossen farm, Section 11. Same company is drilling No. 7-3,567 L. N. P. Poland, Sections 8-9, Washington Township. Same company has a light gas well in No. 1-3612 Edwin F. Jones farm, Lot 89, Lick Township. Libby-Owens Glass Co.'s No. 1 B. E. Davis, Section 16, Jefferson Township, is a dry hole.

In Stark County, Lawrence Township, the Penn Oil & Gas Co, has a nice gas well on the Christ Luther, Section 3, from 3,879-3,911 fet. Same company is starting a second test on the Phil Moke farm, Section 4. Johnson & Stolz made a location on the Martha Woods, Section 33, Tuscarawas Township.

In Guernsey County, Wheeling Township, the North Salem Oil and Gas Co.'s No. 3 C. and A. Gray farm, Section 11, produced an initial of 90 bbls. In this well the top of the Niagara lime was found at 3,242 feet; top of lime sand, 3,412 feet; lime pay 3,414-19 feet; total depth, 3,420 fet. Ohio Fuel Gas Co. is drilling No. 1-4779 on the Issac Gramblit, Section 10. Same company is drilling on the Charles D. Kackley, Section 36, Spencer Township.

In Belmont County, Somerset Township, Lewis and others' test on the Butler-Vogt farm, Section 31, is a fair gas well in the Berea sand from 1,597½ to 1,607½ feet.

In Harrison County, Short Creek Township, the Harrisville Oil & Gas Co. is starting on the R. Mercer farm.

In Morgan County, the Bowman Oil & Gas Co. has an average gas well at No. 2 C. Spurrier farm, Section 26, Marion Township, in the lower Berea sand from 1,598 to 1,650 feet. Same company is drilling No. 3 Charles Bowman, Section 7. W. C. McBride, Inc., is drilling No. 5 Marion Mills, Section 26 Williams Brothers are drilling No. 4 Arthur T. Smith, Section 12, and the Ohio Fuel Gas Co. is drilling No. 2-4806 on the Russell Janes, Section 24, same township. In Deerfield Township, Pierce and others have a very light gas showing in No. 2 on the C. H. Allen and others' farm, Section 5. The Kemrow Co. is drilling No. 3 Mary E. Glassford farm, Section 11, Penn Township.

KENTUCKY-TENNESSEE

(Continued from Page 101)

Grover Cox, veteran field man for Ellis & Young, is moving his family to Greenville from their present home at Owensboro.

Greenville is a beautiful little city of some 4,000 people. It is located on the Illinois Central Railroad and a macadamized highway runs to Central City, 6 miles east. Central City is connected with Owensboro by a hard gravel road.

The Ohio Oil Co.'s No. 3 on the R. O. Kennedy farm, a mile south of Greenville is an offset to the big well on the Brashere farm, which was drilled by Ellis and Young. This No. 3 Kennedy is around 600 feet from the Brashere well and is said to make a better showing. When the pay in the Kennedy was struck, the drillers were unable to control the spout of crude and a great deal of it got away before it could be shut in. The oil was struck at a depth of 1,663 feet and only about a screw in the sand. The well shows for at least a 700-bbl. or better initial, and boosts what looks like the coming field of the western division of the State. The oil is found in what is pronounced the McCloskey sand, which was first found in the Bridgeport Field of Lawrence County, Illinois, more than 20 years ago, which was a phenomenal producing sand although there was not much thickness to it. The big well on the Kennedy farm brought many sightseers to the coming new oil field of Kentucky.

TENNESSEE

Tennessee has another wildcat that is attracting considerable attention. This well was drilled by Newell and Pinion on the J. M. Brown farm, 7 miles east of Charlotte, the county seat of Dickson County, Tennessee, and is reported to have all the earmarks of a good producer at a depth of 1,250 feet. The well was drilled for St. Louis interests who are also drilling and have production in the Dupo Field in St. Clair County, Illinois. The oil is a light green color and will test from 40 to 42 gravity. The sand was not drilled into over 5 feet when the oil rose to 700 feet in the hole. It was bailed for over an hour without lowering the level.

Oil was first discovered in Dickson County, Tennessee, right after the Civil War. To be exact, oil was first found in Dickson County on Jones Creek in 1866. A well drilled on the G. W. Brown farm struck oil at a depth reported at 295 feet and flowed 13 bbls. in 30 minutes. Several wells were drilled at that time that showed for good production of high grade oil, but as the wells were far from market with no transportation other than ox teams over poor trails the wells were soon abandoned. About 25 years ago two other wells were drilled, both on this same farm where this new well has just been brought in. One of these wells was a big gas producer. In fact it blew in and sanded up and was abandoned. The other was an oil well that flowed for weeks with no effort made to save the oil or the well. After this well ceased to flow it was rigged for pumping. In drawing the tubing to reset the working barrel the tubing pulled apart and several joints of tubing together with the working barrel were left in the hole where it still remains, no other effort being made to reclaim the well.

While Hugh D. Miser was state geologist of Tennessee, he published a bulletin on the possibilities of petroleum in Dickson County, Dr. L. C. Glenn, professor of geology at Vanderbilt University, Nashville, Tenn., has made an exhaustive study and report on the geology of parts of Dickson County, Tennessee.

This new well on the J. M. Brown farm is about 35 miles air line west of Nashville, Tenn., and on the western side of the Highland Rim and also on the western flank of the Cincinnati uplift. The well was spudded in about 50 feet below the base of the Chattanooga (Devonian) black shale. The Pencil Cave (Bentonite) was passed at around 750 feet, which would put the pay at 500 feet below the Pencil Cave. This is below the Hermitage formation of the Stones River group of the Ordovician which has been a consistent producer in Clay and Jackson Counties of eastern Tennessee. It is thought that this pay may correlate with the McCloskey sand of southern Illinois. It is the McCloskey that is the producing element in the wells in the new Greenville, Ky., Field in Muhlenberg County. These wells produce from a depth of 1,670 feet. It is very possible this new well in Dickson County, Tennessee, is producing from the McCloskey level, and if such is the case, it should mean the opening of another productive pool for Tennessee.

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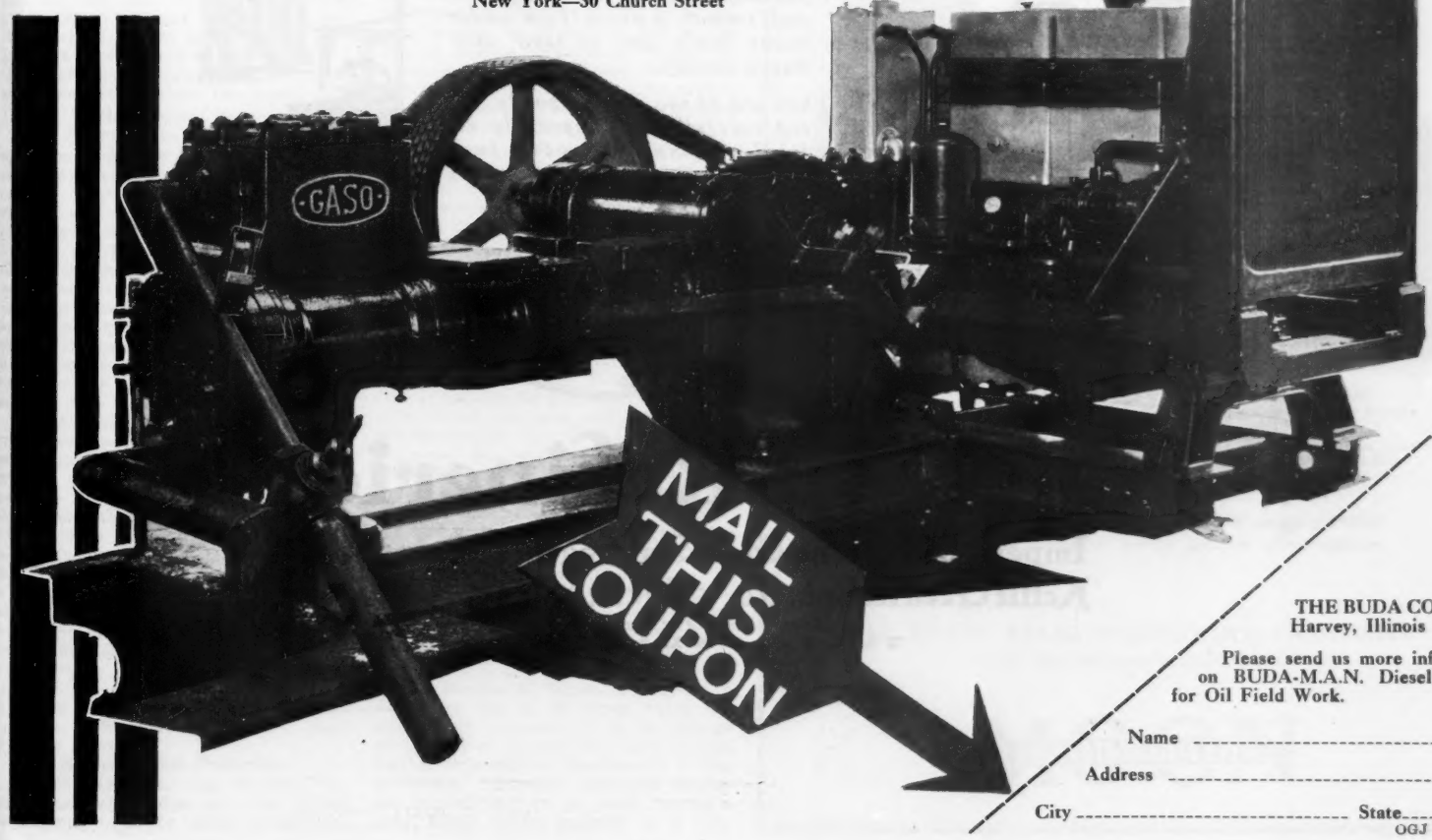

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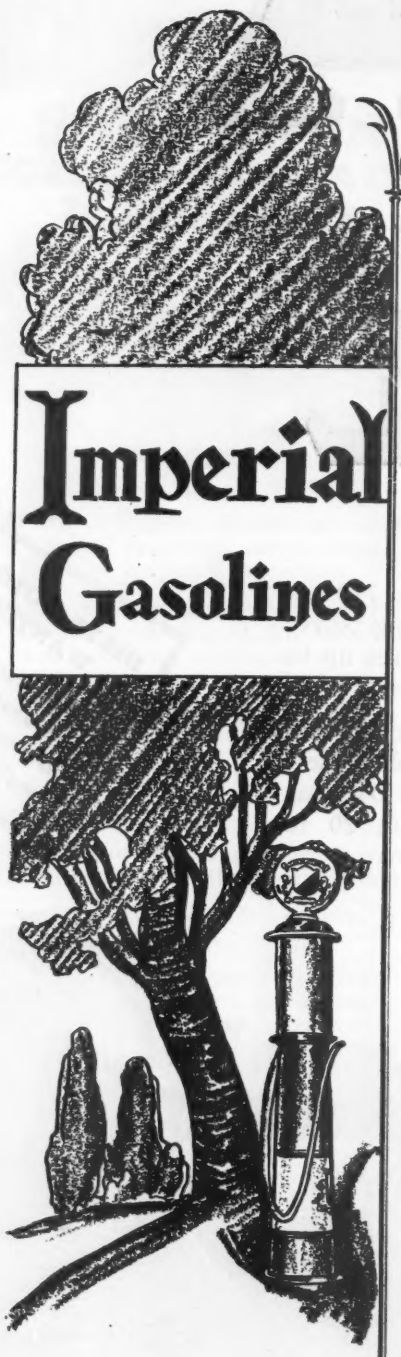

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TULSA, OKLAHOMA

ADDED IMPORTANCE OF RICHLAND FIELD

(Continued from Page 156)

horizon where well connections have been cut by the sand. The exact depths at which production will occur are uncertain as they range from 2,325 to 2,500 feet. Certain tests on the structure have produced immediately below the black shale while others have gone deeper before getting the gas. Examples are the S. D. Hunter No. 2-B McCoy, 1 mile northwest of Alto which produces from 3 feet below the base of the Midway and at a total depth of 2,328 feet. The No. 1-C Hemler, drilled by the Richland Production Co., found production between 2,475 and 2,500 feet, or over 135 feet below the base of the Midway.

Two other tests in the Alto district have drilled considerable distances below the Midway without securing production, Dixie Oil Co.'s No. 1 McCoy in Section 29-16-6, abandoned at 2,683 feet, 351 feet below the base of the Midway, and Magnolia Petroleum Co.'s No. 2 J. Sartor, Section 16-16-6. The former was dry at 2,454 feet, average depth of production, and tested salt water with 1,000,000 feet of gas at 2,482 feet. Tests at 2,650 and 2,683 feet also were salt water. The Magnolia well was dry at 2,450, 2,495, 2,520, 2,562 and 2,575 feet and was drilled to 2,633 feet without any better results, and when a shot at 2,400 feet had produced no better results, it was abandoned.

That part of the field in Township 17-6, although producing from the same depths as at Alto, is producing from beds stratigraphically lower than those at Alto. This area also has wells of very low initial open flow.

Monroe Gas Formation

Of special interest is the occurrence of the Monroe gas formation on the flanks of the Richland structure. Just beyond the southwest end of the field in Section 9-15-5, Richland Production Co.'s No. 1 McDonald found the equivalent of this Monroe gas rock at 2,517-78 feet, and below it was 286 feet of upper Cretaceous, which beds are not present on the Richland structure. The well had not reached the red and gray beds of the producing horizons of the Alto district at 2,864 feet, although the base of the black shales had been reached at 2,517 feet. This illustrates the convergence of the upper Cretaceous beds as the Richland structure is approached from the southwest. Igneous rock was found in Moody-Seagraves' No. 1 Osborne in the NE of Section 14-15-5, 1 mile south of the field. It was a basalt found at 2,475-2,500 feet, the total depth. Upper cretaceous beds were immediately above the basalt.

Fine-Grained Sand

Sand conditions in the producing horizons are such that in most cases it is not safe to open a well to gauge its capacity. The sand is extremely fine grained and under the heavy pressures encountered needs but a pin hole to start a fatal cut in casing and connections. As an instance there is the case of a well that was opened for gauging volume and closed pressure. In taking the latter the top gate was closed and gas started through a pin hole in the nipple just below it. Thirty minutes later the top gate was lying on the derrick floor and the well was blowing wild.

But in spite of high pressures and tricky sand conditions the field has been comparatively free of wild wells and craters, largely because the operators and the State Department of Conservation's Minerals Division got together and formulated a set of drilling, casing and cementing regulations that have been rigidly adhered to. They had warning of what they would have to contend with before the discovery well was completed when one of the wildcats which helped locate the field and, later, to define its southwestern extremity blew out and cratered due to lack of experience with Richland conditions but it was not until January, 1928, that they got their most effective lesson.

Enormous Gas Producers

In this case a well near the then center of production blew out after it had been completed as the largest in the field, 67,200,000 feet at 1,125 pounds causing a crater 75 to 100 yards across which defied all efforts to conquer and is still blowing 20,000,000 feet of gas into the air. Relief wells do not show, however, that this crater has had so great an effect on the area immediately surrounding, as they were completed gauging 64,000,000 feet at 890 pounds and at present are good for probably 45,000,000 feet at 675 to 700 pounds. Another crater was formed when gas started leaking up the outside of the pay string some time after the well had been completed got into a fresh water sand at around 400 feet and traveled some distance before reaching the surface and forming the crater. A third crater was attributed to making too much hole with too light drilling mud before cementing the second string. The bit went into the pay unexpectedly and created a hopeless situation. Relief wells were resorted to as the one slender chance, the first two blowing out with gas that had permeated the 400-foot water sand but the third still drilling succeeded in getting through this horizon and cementing off this seepage gas.

Field With a Future

As remarked before, development of the field from the standpoint of utilization of its resources is just beginning, though it has been drawn upon for fuel by pipe lines serving New Orleans, south Arkansas communities, Memphis, Houston, Beaumont and Port Arthur, the total withdrawal to July 1 approximating 26,000,000,000 feet. Ninety-two wells have been completed with a total open flow of 2,974,360,000 feet of which 690,086,000 feet per day is available under the conservation department's "permissible withdrawal" regulations.

This permissible withdrawal is a percentage of the open flow capacity of the well determined by the area of the tract from which the well is to pull and the center of which is the location of the well and ranges from 9 per cent in the case of a well in the center of a five-acre tract to 24 per cent for a well in the center of a 160-acre tract. In cases where the percentage reduces the permissible withdrawal below 1,000,000 feet per day, 1,000,000 feet may be taken, provided a working pressure of half the closed pressure is maintained, but in no case shall the working pressure be less than 200 pounds except in cases where the department has specified a lower one. Rock pressures within a mile of the first of the craters referred to have dropped to an average of 750 pounds—the crater has been blowing for 20 months—but for the last six months pressures in the field as a whole have declined only 62 pounds. The accompanying map shows the various pressure zones of the field as outlined by completions to date.

Two Hundred Square Miles Proven

Proven acreage of the field at present is figured by the conservation department at approximately 200 square miles, or 128,000 acres, practically all of which is capable of much more intensive development than the field has yet had. The Monroe Field has a proven area of 400 square miles or 256,000 acres, yet engineers figure that Monroe, with twice the area, has only one third more recoverable gas per acre than Richland. They estimate Monroe has 3,000,000,000,000 feet of recoverable gas remaining or 12,000,000 feet per acre, and Richland 2,000,000,000,000 feet or 15,000,000 feet per acre. But neither Monroe nor Richland have been developed in the directions in which it remains to be proven gas does not exist; to the northwest in Monroe and northeast and possibly east and southeast in Richland.

Estimated Productive Life

At the present rate of consumption Richland is estimated to have a productive life of 30 years, somewhat less than Monroe which, when surveyed in 1921 by Bell and Cattell of the United States Bureau of Mines, was given a productive life of 20 years which has since been extended by later surveys another 10 or 15 years and may be still further extended by development to the northwest. Richland's estimated shorter life is predicated on the wells, having a much larger initial capacity, as a rule,

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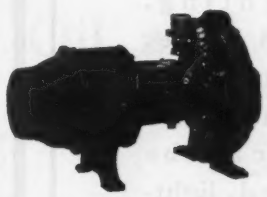

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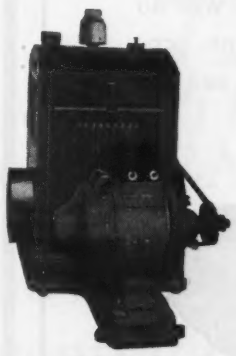

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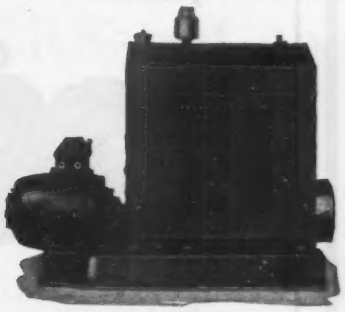

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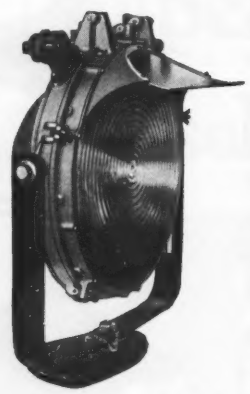

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than Monroe wells, permitting a larger withdrawal. This suggests a quicker depletion, but as depletion progresses permissible withdrawal is reduced twice a year according to results shown by semi-annual re-gauge of pressure and volume thus slowing down the rate of depletion and prolonging the well's productive life. It would seem the two balance each other, in which case future extensions which may be expected would have their effect in prolonging the life of the field beyond the 30-year estimate.

But in any event, 80 per cent of proven and potential production in Richland being in the hands of an organization in which all the major operators in the territory are represented and which is obligated to meet heavy committments to supply varying percentages of the huge consumption of three major pipe lines now building, would appear sufficient guaranty that the best practices in drilling and pulling wells operators and conservation authorities can devise will be followed. The greatest menace to the field at present is the adopted plan for controlling Mississippi floods under which the entire field is subject to overflow by an uncontrolled "floodway" which would cover it deeper than did the flood of 1927.

On the other hand, this present rate of consumption—278,278,000 feet per day—will not remain long, for as soon as the three lines now building are completed they will pull a large part of their 300,000,000 feet per day from Richland. It has been estimated by company engineers that all the lines feeding from Richland and Monroe Fields at capacity will require 740,000,000 feet per day to supply their consumers in Arkansas, Alabama, Georgia, Illinois, Louisiana, Mississippi, Missouri, Tennessee and Texas.

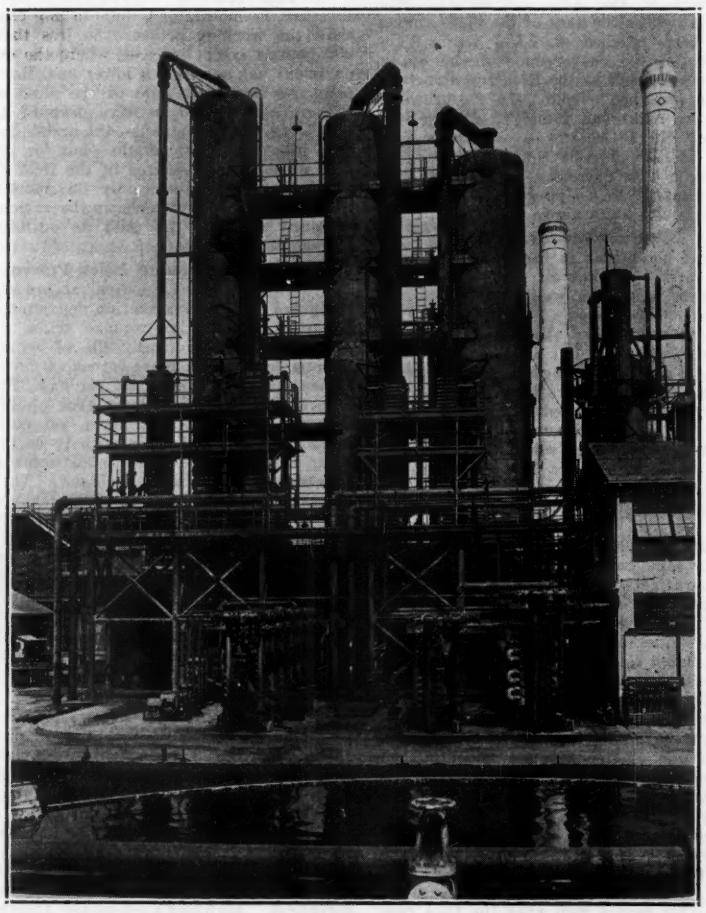
Gas to supply these and future lines depends upon the gradual withdrawal from Monroe and the nonappearance in Richland of carbon plants. Only one plant under construction has been located in Richland and under the circumstances related as to gas production, present and future requirements, the inference is that very few if any will follow. Plants in the Monroe Field are consuming at present approximately 250,000,000 feet per day. Pipe line requirements of 740,000,000 feet expected to be reached in 1930-31, depletion and consequent reduction of permissible withdrawal necessitating continuous drilling of vacant proven territory form a combination the lure of easy profits from the carbon industry cannot stand up against. Even if the interests controlling Richland were disposed to burn their present excess gas for carbon it is to their own interests not to.

Location for Gasoline Plants

As a location for gasoline plants, however, Richland is favored. No such restrictions as to extraction of gasoline from gas going to pipe lines apply to its extraction before the gas is burned for carbon but since it is common practice to process gas for this purpose Richland's development will make it a factor in the natural gasoline industry. With one plant, the largest in the United States, completed and three others under way the start has been made and more plant will follow. The first plant, the Palmer Corp.'s establishment at Alto, was designed and completed as a 100,000,000-foot gas capacity plant but when the Palmer became a dominant factor in the merger resulting in the Louisiana Gas & Fuel Co. controlling most of the proven and potential production in the field it was determined to add another unit increasing capacity to 150,000,000 feet. Columbian Gasoline Corp. is building a 40,000,000-foot capacity plant in the same area, International Gas Products Co. is building a plant of 30,000,000 feet capacity and United Carbon Co. also is building a plant.

Gasoline content and other constituents of natural gas are not constant in Richland but, as in the case of Monroe, varies in different parts of the field. Tests to date, however, reveal a content of .275

TOWERS AND EXCHANGERS AT RICHFIELD REFINERY



Fractionating towers, condensers and exchangers recently installed at the Hynes, California plant of the Richfield Oil Co.

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G. Lynn Sumner, Pres., G. LYNN SUMNER CO., before the Advertising Class of the New York Advertising Club

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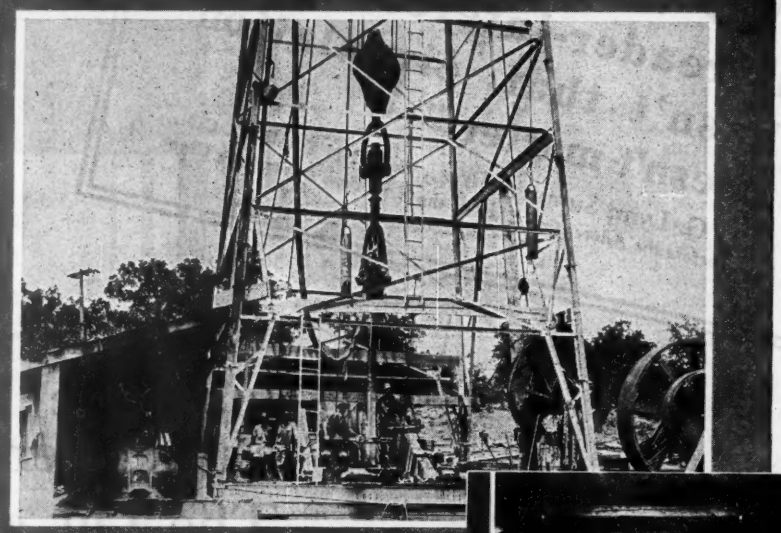
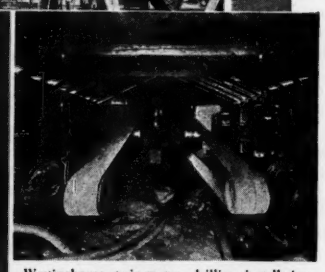
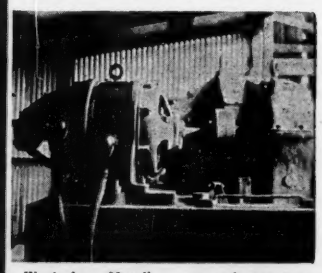


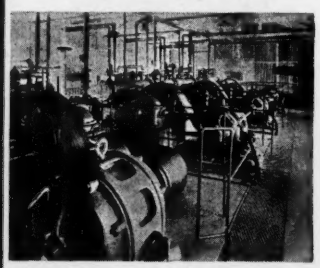
Typical installation of Halliburton drilling control and Westinghouse motor-driven mud pump.



Westinghouse twin-motor drilling installation which drilled world's deepest cable tool well.



Westinghouse-Nuttall two-speed pumping motor and double reduction gear unit.



Westinghouse CS motors driving compressors in air and gas lift station.

LOOK behind the achievements with which electricity has been identified and you will find Westinghouse equipment at almost every turn.

Westinghouse engineers were quick to answer oil field problems with equipment especially designed for its task. The twin motor drive for cable tool drilling is exclusively theirs. They co-operated in the development of the Hild and Halliburton drives, with automatic feed, for rotary drilling. They introduced practical two-speed motors for pumping. They brought reduction gears with change-gear feature; developed practical arc-welding equipment; perfected rig lighting units, change house heaters, portable transformers.

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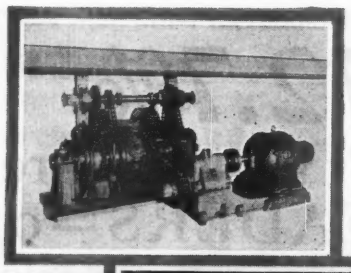
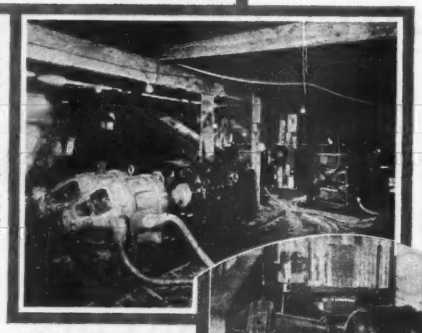
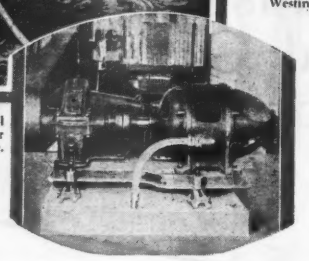




Above—Halliburton drive, automatic feed, for rotary drilling.

Right—Installation of Hild drive, automatic feed, for rotary drilling.



Right—Westinghouse-Nuttall two-speed pumping motor and single reduction gear.

Information regarding Westinghouse equipment for the oil industry may be obtained from any branch of the National Supply Companies or the Oil Well Supply Company, located in all oil fields, or from any Westinghouse district office.

Westinghouse

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to .3 gallon per 1,000 on which basis the first three plants running at their combined maximum of 220,000,000 feet per day will turn out from 60,000 to 66,000 gallons of gasoline. The one carbon plant in the field referred to will be operated in connection with its gasoline plant by the International Gas Products Co. and will turn out a maximum of 20,000 pounds of black per day from one 30-unit and one 20-unit installation employing the standard channel system.

EASTERN FIELDS

(Continued from Page 84)

second test on the Edgar Fox farm. In Mannington district, Sutton Brothers are drilling on their own farm.

In Grant district, Wetzel County, the South Penn Oil Co. has drilled to 2,476 feet on the L. S. Watters farm and shut down. In McElroy district, Tyler County, H. Underwood & Co. have a rig up on the F. M. Williams farm. In Grant district, Doddridge County, Stephens & Collins are drilling on the W. W. Spencer farm. In Church district, Wetzel County, Funk & Moorhead have a rig up on the Charles Snodgrass farm. The Delmar Oil Co. is drilling a second test on the Palmer heirs' farm. In Ellsworth district, Tyler County, J. H. Penzt has a rig up on the J. A. and Elva Smith farm. In Magnolia district, Wetzel County, H. M. C. Oil & Gas Co. has a rig up on the James Carpenter heirs' farm.

Mingo County

On Jack Fork branch of Turkey Creek, Harvey district, Mingo County, the Wilson Coal & Land Co. has the rig completed on the C. C. Mercer farm. In Ellsworth district, Tyler County, the Oakland Oil & Gas Co. has a rig completed on the Frank Lancaster farm. In Glenville district, Gilmer County, the Pittsburgh & West Virginia Gas Co. has the rig completed for a second test on the J. W. Wolfe farm. In the same district the same company has a rig up for a second test on the C. P. Snider farm. In Clay district, Wirt County, W. C. Patterson completed a rig on the Vernon-Donoho farm. On the Kanawha River, Sheridan district, Calhoun County, the Maze Oil & Gas Co. completed the rig for a second test on the S. P. Maze farm. In Center district, W. H. Bickel has the rig completed on the A. E. Kennedy farm.

On the waters of Mud River, Grant district, Cabell County, the Harshbarger Oil & Gas Co. has started to drill a second test on the A. & O. Conner farm. On the same stream and district the Larner Gas Co. has started to drill on the W. E. Sias farm. On Charleys Creek the same company has started to drill on the W. S. Sias farm. On the same stream the same company has started to drill on the John Janey farm. In Jefferson district, Kanawha County, the Charleston-Dunbar Gas Co. has the rig completed on the Frank Wiseman farm.

In McElroy district, Tyler County, local parties have started to drill on the Marion Williams farm. In Cameron district, Marshall County, the Manufacturers Light & Heat Co. is rigging up on the H. F. Phillippi farm. In Cass Township, Monongalia County, the Carnegie Natural Gas Co. is building a rig on the Rufus F. Lazzell farm.

In McClellan district, Doddridge County, the Conservative Gas Co. has rig material at a location on the Dora McDonald farm. In Ten Mile District, Harrison County, the same company has made a location on the Icy Mason farm. In Grant district, Ritchey County, H. N. Rinehart is drilling a second test on the Daniel Donley farm.

SOUTHWEST PENNSYLVANIA

In Penn Township, Allegheny County, the Pine Oil Co. completed in the 100-foot sand a test on the Rebecca A. Walley farm. The hole filled up 1,000 feet with fluid and is showing for a 10-bbl. pumper. In Cecil Township, Washington County, R. C. Mason & Co.'s test on the Thomas Shane farm is a 3-bbl. pumper in the Fifth sand.

On Bates Fork, Morris Township, Greene County, the Carnegie Natural Gas Co. completed a second test on the Allen Iams farm. It is a gasser in the Big Injun sand good for 600,000 feet. In Springhill Township, James Null & Co. completed a second test on the Davis Null farm a gasser in the 50-foot sand. In Morris Township the same company has started to drill on the W. L. Scott farm. J. B. Null & Co. has a rig up on the John Lewis heirs' farm. In Claine Township Washington County the National Drilling Co. is due in the sand on the C. E. Crothers farm. In East Finley Township the Natural Gas Co. of West Virginia has started to drill on the J. P. Plants farm.

In Harmer Township Allegheny County, Rogers & Beal have completed a test on the Elizabeth Campbell farm, good for 3 or 4 bbls. They are starting a second test on the same farm. In the same township the same parties are drilling at 1,700 feet on the Henry Kemper farm. In East Deer Township the Chartiers Oil Co. is drilling on the Frederick Torner farm.

GASOLINE OBTAINED FROM VENEZUELA OIL

(Continued from Page 242

large part of its Atlantic Seaboard gasoline requirements from its Eastern refineries at Bayonne and Philadelphia, which are reported to be running entirely on Venezuelan crude.

Tide Water Oil Co., which has no Venezuelan production of its own, has been receiving Venezuelan crude oil in fairly large quantities in recent months from Curacao and Las Piedras, and is running South American Oil in a large way at its Bayonne plant.

Standard Oil Co. of New Jersey has just reached the point where it is getting into the Venezuelan production picture in a substantial way. At present, Creole Petroleum Co., Venezuelan producing subsidiary of the Standard Oil Co. of New Jersey, is shipping an average of about 20,000 bbls. of crude daily to the Jersey Standard's refineries at Bayonne and Baltimore. This accounts for all of Creole's Venezuelan production at the present time.

Venezuelan crude is growing as a factor in the East Coast refinery situation, and it is expected that within a comparatively short time refineries in this area will be using more Venezuelan oil than domestic crude. Imports from Venezuela during the first seven months of 1929 were more than triple those for the comparable period in 1928, and accounted for 33,835,000 bbls. out of the total of 49,974,000 bbls. of crude imported from all countries. Comparative data on imports during this period follows:

	Bbls. First 7 months	
Country—	1929	1928
Mexico	7,151,000	26,757,000
Venezuela	33,835,000	10,147,000
Colombia	7,154,000	7,635,000
Other countries	1,834,000	1,530,000
Total	49,974,000	46,069,000

KANSAS CITIAN TELLS OF OIL

The October 1 number of the Kansas Citian, published weekly by the Chamber of Commerce of Kansas City, Mo., is devoted to the oil industry and it contains articles of unusual interest. A picture of W. G. Skelly, president of the Skelly Oil Co. and of the International Petroleum Exposition which is being held in Tulsa this week, appears on the front cover page, and an article by him, "Kansas City and the Oil Industry," is among the features of the magazine. Another article tells about the big oil show, its exhibits and its program of entertainment.

VENEZUELAN PRODUCTION

NEW YORK, Oct. 5.—Venezuelan Oil Concessions, Ltd., reports for the week ended September 21 production of 128,596 metric tons of crude oil in Venezuela, as compared with 130,196 metric tons in the previous week. This is a daily average of 18,371 metric tons, against 18,599 tons daily in the preceding week.

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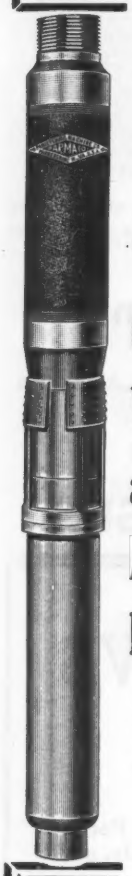

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GERMAN DEVELOPMENT IN SCIENCE OF GEOPHYSICS

(Continued from Page 190)

The Askania-Werke has recently organized the American Askania corporation, sales office in Houston, Tex. It is intended to establish also a repair shop in Houston in order to accommodate the needs of the users of the instruments better than it has been possible before. The Askania-Werke will furthermore, now begin to push the sale of other than geophysical instruments in this country.

The company had been manufacturing for several years the Sterneck four-pendulum apparatus which is used by most European geodetic institutions. They are now designing a special type for pendulum prospecting, a two-pendulum apparatus equipped with wireless transmission of the oscillations of the pendulum at the central station, and with visual observation or photographic recording arrangement at the field stations. It is expected to increase the accuracy of the observations considerably with the new instrument. Also a new shape of the pendulum will be used. The Askania-Werke is conducting extensive laboratory experiments to improve the operation of torsion balances under unfavorable temperature conditions. One interesting result of these experiments is the fact that the deflections of a torsion balance beam when temperature changes are very nearly in proportion to the second derivative of the temperature with respect to time. The company is constantly improving the design of its balances so as to make the operation of the automatic part as simple and dependable as possible. Types of torsion balances totally different from the standard type have been built for special investigations, as for instance the continuously rotating torsion balance as devised by Kilchling, a balance with beams inclined 45 degrees, a vacuum balance, a torsion balance with extraordinarily heavy weights, etc. The experiments with all kinds of wires, metal bands, etc., are continued. Several models of integraphs according to Schweydar for the graphical interpretation of pendulum and torsion balance results have been built, and it is expected that the experiments will soon be concluded so that the instruments are available on the market. With two of these instruments, the influence of subterranean masses or surface topography may be determined upon gradients and curvature values by tracing contour lines. A third instrument determines the influence of two-dimensional features on gradients and curvature values by following their outline in a vertical section with a pointer, A fourth instrument, very similar to the third, has been constructed to find the influence of two-dimensional features upon the gravity, for pendulum measurements. As to seismographs, the Askania-Werke has developed a very convenient method for the transmission of the time of explosion by wireless. It uses quartz-controlled shortwade transmitters built by the Lorentz company in Germany; a blasting cap in series with the cap in the charge actuates at the instant of the explosion a contact which instantaneously turns on the B-battery voltage of the transmitter. At the receiving end, a combined amplifying and rectifying device carries the received energy from the receiver to an electromagnetic indicator to which a mirror is attached. Besides this equipment, the Askania-Werke has employed radios constructed in the laboratory of the Colorado School of Mines, which are used with small oscillographs designed by the writer; the oscillographs are built in the heads of the seismographs. The breaks as well as the makes of the transmission of the shotpoint radio may be used. The mechanical two-component seismograph has been and will be improved in several respects. The adjustment of the mirrors will be easier, the speed of the paper is adjustable, four speeds are provided. The Schweydar seismographs are manufactured by the Rohde Mechanical company in Potsdam for and in co-operation with the Askania-Werke. Extensive experiments are made in the laboratories of the Askania-Werke and the shop of Rohde with a new electrodynamical seismograph. The recording element of these new devices is a Zeiss-loop galvanometer. The construction of geophones is also now being done. Efforts are made to improve the recording elements of the radio receivers; the writer is experimenting with a new indicator that does not apply the galvanometer or telephone principle and works without inertia. Rohde is building a very small three-component vibrograph designed by Schweydar for the registration of the vibration of buildings, engines, etc.

Magnetic Instruments

As to magnetic instruments the Askania-Werke is conducting extensive laboratory experiments on the magnetic properties of various alloys of steel used in magnetometers. The Cobalt steel despite of having a great number of advantages (higher magnetic moment, greater coercive force) did not seem to live up to the expectations placed in it. according to the experiences of the users of magnetometers. It seems that steel with less cobalt than now used would act more permanent. It also seems that although a good cobalt steelmagnet is better than a good tungsten steel magnet, it is much more difficult to obtain a good magnet from a bar of cobalt steel of a given length than from a bar of tungsten steel of the same length. Therefore, it is very important to select the magnets very carefully. The Askania-Werke are now testing the expansion coefficients, the temperature coefficients of the magnetic moment and the temperature coefficient of the electric resistance of a great number of samples, in order to find a physical characteristic that will allow to select good magnets quickly from a large amount of specimens. For the time being and until definite results are obtained, the company will supply the customers either with cobalt-steel magnetic systems or tungsten steel systems if preferred. A new casing for magnetometers has been designed, in which either a horizontal or a vertical magnetic system may be placed. The optical system of this casing is so arranged that it may be used for visual observations as well as photographic registration. An experimental model of an all enclosed recording station for horizontal and vertical magnetometers has been built; both components are recorded simultaneously on a photographic plate. Experiments are made with Rotary Inclinators to fit them for intensity measurements by means of attached Helmholtz coils. The Askania-Werke is manufacturing the universal magnetometer designed by Haalck which was formerly made by the Exploration company. The company has its own observatory for testing magnetometers. Special devices provide all kinds of temperatures. Scale values and latitude adjustments are made with Helmholtz coils. The observatory is at Bornim near Berlin. It was formerly at Wannsee. but this location had to be given up as the Interurban Berlin-Potsdam changed over from steam to electric power.

Torsion balances and magnetometers are furthermore made by the Topfer company in Berlin. Topfer operated formerly an independent factory for scientific instruments which was taken over by the Askania-Werke after the war. In the past year, Topfer has severed his connection with the Askania-Werke again and is now operating his own plant.

The Haff company in Bavaria has recently begun to manufacture torsion balance, but it could not be learned if the manufacture has been discontinued or not.

The Spindler & Hoyer company in Goettingen manufactures Wiechert's seismographs for seismic stations and Mintrop's vibrographs for the registration of artificial vibrations; the types manufactured by Spindler & Hoyer, however, are not the same as used by Mintrop in his field work.

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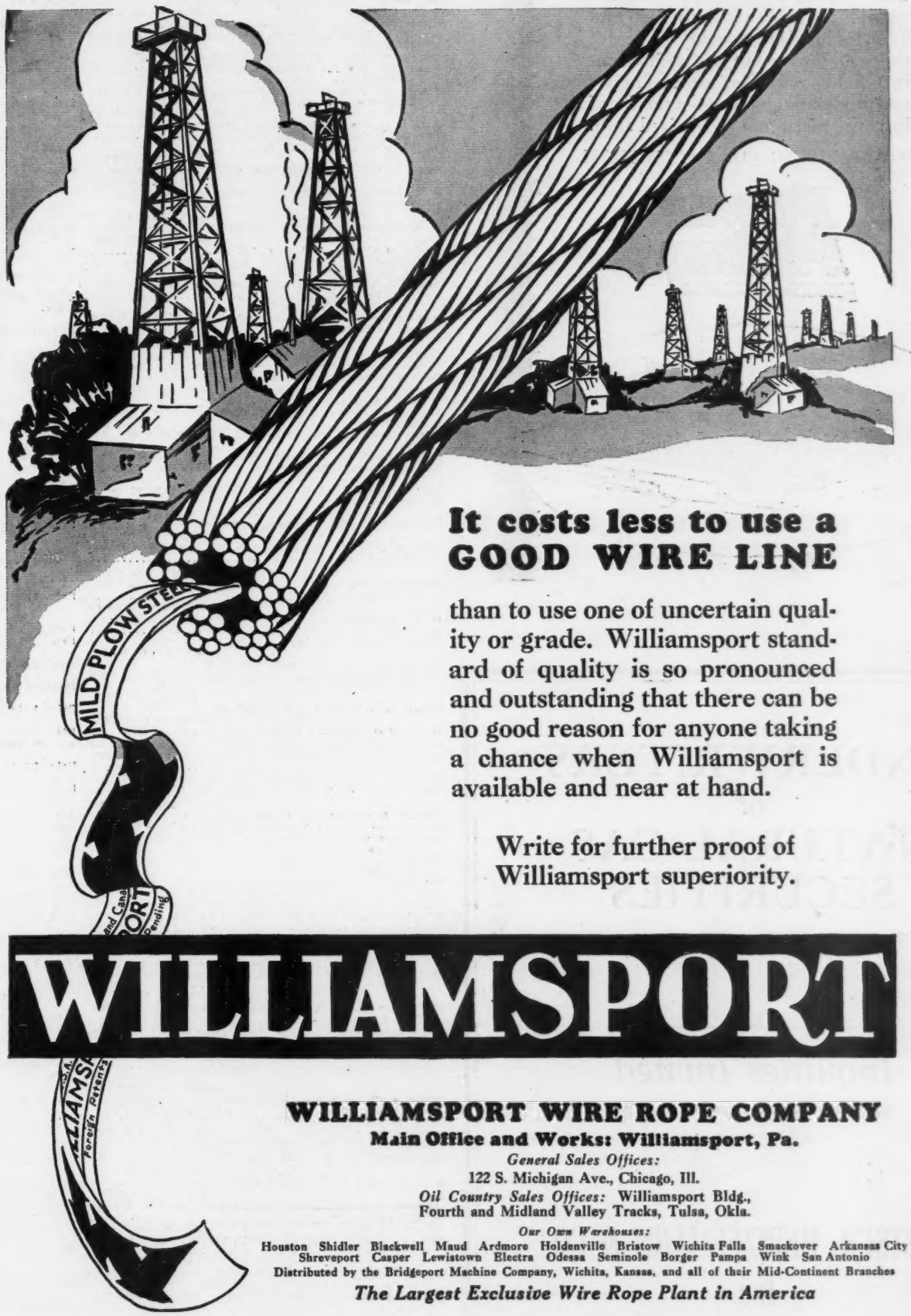

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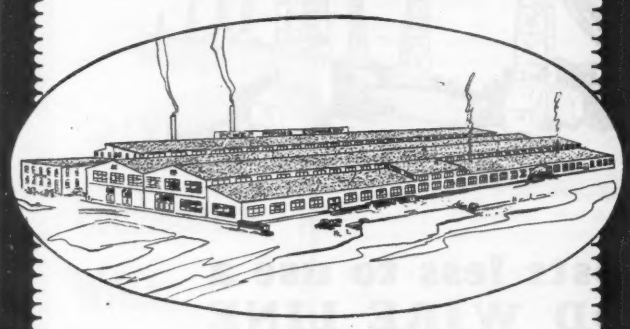

UNDERWRITERS *of* NATURAL GAS SECURITIES

Inquiries Invited

ZWETSCH, HEINZELMANN & CO. Inc.

57 William Street New York, N.Y.

WILDCAT OPERATIONS IN KANSAS

(Descriptions are East unless otherwise marked)

(Continued from Page 69)

DICKINSON COUNTY

Cress & Hawky's No. 1 Menli, NE cor. Sec. 12-15-2 .....Abandoned.
Hiatt & Durham's No. 1 Wendt, NW cor. Sec. 17-16-3 ..Rig.
Kruger et al's No. 1 Diche, C NW NE NE Sec. 17-13-4 .....Drlg. 630 ft.

DOUGLAS COUNTY

Jenkins & Scott's No. 1 Haden, SE NW Sec. 10-12-17 ....Shut down.

ELLIS COUNTY

Streeter & Stearns' No. 1 Leiker, SW NE Sec. 26-13-20w..Spudding; shut down.
Mid-West Exploration's No. 36 Berens, C SE NW Sec. 12-13-16w .....Drlg. 2,620 ft.
Byrens et al's No. 1 Fisher, NW SE Sec. 4-11-20w .....Drlg. 855 ft.
Rush Oil Co.'s No. 1 Gatewood, NW cor. NW Sec. 4-15-20w .....Fishing 2,555 ft.
Finney & Weiner's No. 1 Freeman, SE cor. SW Sec. 24-15-20w .....Spudded and abandoned.

ELLSWORTH COUNTY

Tatlock et al's No. 1 Sackem, C SW SE Sec. 25-17-9w....Shut down 675 ft.
The Texas Company's No. 1 Sherman, NE SW Sec. 16-17-6w .....Drlg. 2,885 ft.

FORD COUNTY

Swain et al's No. 1 Kenthorne, C NW Sec. 21-25-24w ....Shut down 300 ft.

GRAHAM COUNTY

Gulf Coast Oil Co.'s No. 1 Johnson, C S half Sec. 27-8-25w .....Drlg. 4,108 ft.

GREENWOOD COUNTY

F. Konkay et al's No. 1 Rock, NW NE NE Sec. 7-27-12..Shut down 50 ft

HARPER COUNTY

Boeler et al's No. 1 Bear, C NE Sec. 21-31-6w .....Rig.
Tom Slick Oil Co.'s No. 1 Miller, SE cor. Sec. 13-34-8w .....Drlg. 5,025 ft.
Tom Slick Oil Co.'s No. 1 Thompson, NW cor. Sec. 19-32-6w .....Viola 4,936-50 ft.; show oil, testing.
Independent & Reserve Oil Co.'s No. 1 Moulds, C NE Sec. 7-24-1w .....Fishing 2,600 ft

HARVEY COUNTY

Liggett et al's No. 1 Regier, C SE NW SE Sec. 2-23-3w..Drlg. 2,010 ft.
Payne and others' No. 1 Ady, NE NW SE Sec. 16-24-1 ....Drlg. 3,375 ft.
Deering-Marshall's No. 1 Dick, Sec. 4-25-2w .....Drlg. 3,575 ft.
McCulloch et al's No. 1 Prouty, NW cor. SW Sec. 3-23-1w .....Fishing 2,030 ft
Roth & Parrent's No. 1 Brombrowsky, NW cor. Sec. 26-22-1e ..... Drlg. 3,492 ft.
Mrs. Gay et al's No. 1 Grove, C NW NE NW Sec. 29-23-1w .....Drlg. 3,205 ft.
Jolly & Ogg's No. 1 Randall, NE cor. NE Sec. 11-24-1w ..Shut down 3,444 ft
Rosenthal et al's No. 1 Ingalls, C NW SW Sec. 24-23-3w..Abandoned 3,850-85 ft.; Wilcox sand; hole full water.
Jolly & Ogg's No. 1 Hupp, SE cor. NE Sec. 22-23-1w ....Shut down 3,220 ft.
Walton Oil Co.'s No. 1 Neiman, C SE SW Sec. 13-14-2....Drlg. 1,235 ft.

HODGEMAN COUNTY

Phillips Pet.'s No. 1 Hausman, NW NE Sec. 30-22-22w ..Drlg. 3,440 ft.

JEFFERSON COUNTY

Wichita Oil Co.'s No. 1 Simpson, NW cor. SW SW Sec. 19-10-17 .....Rigged up and shut down

KIOWA COUNTY

British-American's No. 1 Woodward, NE cor. Sec. 35-27-17w .....Drlg. 5,009 ft.

KINGMAN COUNTY

D. P. Fleeger's No. 1 Ashcraft, SE SW NE Sec. 16-28-7w .....Drlg. 950 ft.
White Eagle's No. 1 Lorenz, C NE SW SE Sec. 25-27-5w..Drlg. 2,160 ft.

LANE COUNTY

Robinson's No. 1 Dickerson, Sec. 11-18-27w .....8-in. csg. 2,625 ft.
Blankenship Pet. Co.'s No. 1 Schaeffer, NE cor. NE Sec. 24-16-28w ..... Spudded and shut down

LYON COUNTY

Sheedy et al's No. 1 Welch, NE cor. Sec. 30-20-10 .....Drlg. 1,850 ft.

MARION COUNTY

Marshall et al's No. 1 Higgins, NE cor. Sec. 33-19-5 .....Rig.
White Eagle's No. 1 Ucker, NE NW Sec. 24-17-2 .....Rig on ground
American O. & R. Co.'s No. 1 Urie, NW SW NW Sec. 10-17-2 .....Drlg. 2,040 ft.
Empire's No. 1 Reising, NE NW NW Sec. 34-20-2 .....Drlg. 2,250 ft.
Davis et al's No. 1 Bartel, SE NE Sec. 1-19-1 .....Drlg. 3,202 ft.

McPHERSON COUNTY

Howard & Travers' No. 1 Cornelius, SW cor. Sec. 7-21-4...Rig.
Reynolds et al's No. 1 Koohn, NE SE NE Sec. 15-20-2w..Rig.
McPherson O. & G. Co.'s No. 1 Fisk, SW NE NE Sec. 15-21-2w .....Drlg. 915 ft.
McPherson O. & G. Co.'s No. 1 Sorenson, C SE Sec. 23-18-3w .....Drlg. 1,870 ft.
Milmac's No. 1 Decker, NW cor. Sec. 11-20-3w .....Rig.
Lario et al's No. 1 Diener, SE SW Sec. 10-20-1w .....Drlg. 2,315 ft.
Perry et al's No. 1 Wade, C SE Sec. 20-19-4w .....Drlg. 2,600 ft.
E. W. Marland's No. 1 Swanson, NE SW NE Sec. 36-18-4w..Drlg. 3,605 ft.
Slick, Pryor & Lockhart's No. 1 Gratton, C NE NW NW Sec. 34-20-3w .....Drlg. 2,710 ft.
Helmerich & Payne's No. 1 Klassen, SE NE NE Sec. 14-21-1w .....Drlg. 3,190 ft.
McPherson Gas Co.'s No. 1 Chinberg, NW cor. Sec. 18-19-2w .....Total depth 3,585 ft.; plugging back to 2,992-3,045 ft.
McPherson O. & G. Co.'s No. 1 Rasmusson, SW cor. Sec. 8-18-3w ..... Drlg. 3,170 ft.
Transcontinental Oil Co.'s No. 1 Algers, NE SW Sec. 1-19-5w .....Drlg. 2,650 ft.
Ted Washabaugh's No. 1 Vosshell, NE cor. NE Sec. 9-21-3w .....Will complete as gas well; skid rig.

MORTON COUNTY

White & Cheney's No. 1 Love, NE cor. Sec. 11-34-42w....Rig on ground

NESS COUNTY

E. W. Marland, Inc.'s No. 1 Moses, NE SE Sec. 7-18-25w..Drlg. 3,865 ft.

OSBORNE COUNTY

Phillips Pet. Co.'s No. 1 Greive, NW SE NE Sec. 6-7-12w..Drlg. 3,260 ft.
Mid-Kansas' No. 1 Boyce, SE cor. NW Sec. 18-6-13w ..Drlg. 3,190 ft.

PAWNEE COUNTY

F. C. Troupe's No. 1 Lovett, CEL NE NE Sec. 31-21-16w.Shut down 1,560 ft

PRATT COUNTY

O'Haver & Jones' No. 1 Garacke, C NE SW Sec. 7-26-14w .....Drlg. 205 ft.
O'Haver & Jones' No. 1 Lunt, C SW NW Sec. 15-28-14w..Drlg. 4,255 ft.
Wilcox O. & G. Co.'s No. 1 Unknown, SW NW Sec. 7-26-15w .....Spudding.

RENO COUNTY

Empire O. & R. Co.'s No. 1 Blitz, NE NW Sec. 36-25-4w .....Drlg. 1,100 ft.
Kaiser & Murphy's No. 1 Friessen, SE cor. NE Sec. 6-22-4e .....Location.
Wilson et al's No. 1 McPhaeters, C S half NW Sec. 22-26-8w .....Rig.
Witt's No. 1 Olsen, C SE NW Sec. 14-23-6w .....Shut down 50 ft.
Skelly Oil Co.'s No. 1 Birkett, NE SW Sec. 30-24-7w ....Drlg. 3,565 ft.
Milmac Oil Co.'s No. 1 Strickley, SW cor. NW Sec. 17-26-5w .....Drlg. 3,725 ft.

RICE COUNTY

Miller & Detrick's No. 1 Shumway, C SW Sec. 2-20-9w ..Drlg. 1,860 ft.
Burgher's No. 1 Fair, C SE NE NE Sec. 14-21-10w ....Rig.
Derby Oil Co.'s No. 1 Johnson, C NW NE SE Sec 24-20-6w .....Fishing 2,300 ft.

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A distinctive feature of the new Longyear Rotacore Drill is a built-in rotary table which permits a rapid change from fish-tailing to core drilling without removal of the table. There are obvious advantages to the operator in this important detail of Rotacore construction.

Rotacore's capacity is 3000 feet of N-size hole, 2¾" in diameter, with larger holes by increasing the size of the bit. The hydraulic has a length of feed of 18", and a lifting capacity of 7 tons.

Rotacore is powered with a Waukesha industrial-type 45 h.p. motor. The transmission is of the Cotta heavy duty type, with three speeds forward and one reverse.

An exclusive feature is the flexible coupling on the shaft which relieves the bearings of all undue wear in case of slight variation in the alignment of the drill and motor. The shaft is telescopic so that the drilling machine can be moved back from the drill hole a distance of 15" by means of hydraulic pressure to permit hoisting of the rods.

All controls, including motor throttle, are at the operator's finger tips. A cat-head has been added in response to the necessities of field experience. The entire unit is mounted on a substantial steel truck equipped with 8" wheels.

You will be interested in the complete description and specifications contained in our new Rotacore Bulletin, No. 32. Write to our branch at Ponca City, Oklahoma, or to Minneapolis for your copy.

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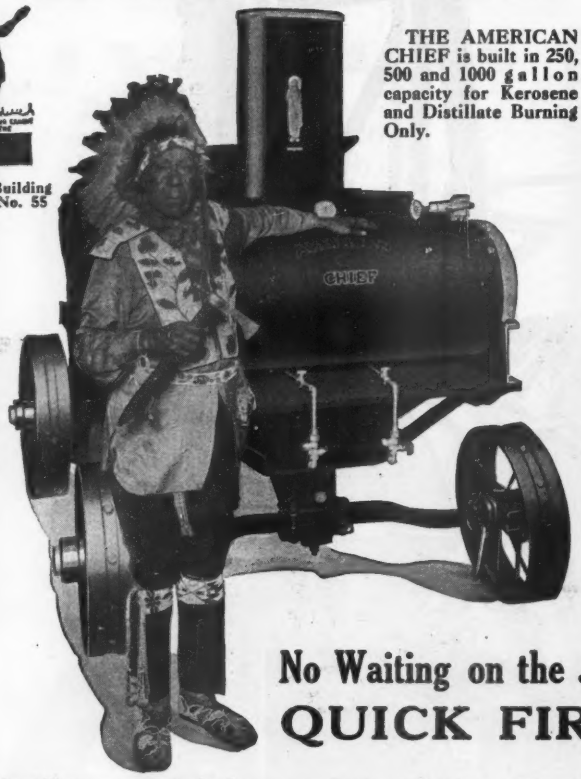

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Swartwout
Rotary Ball Bearing
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Most Air Per Minute Per Dollar Invested

Milmac's No. 1 Cain, C SE Sec. 29-19-7w ..... Drlg. 2,310 ft.
Allison & Fitzwilliams' No. 1 Poland, NE cor. SW NE Sec. 36-19-8w ..... Cellar.
Higgins & Steinbuchel's No. 1 Shurr, NE cor. SW Sec. 21-20-10w ..... 3,278-80 ft.; 100 bbls. showing; testing by swabbing; cleaning out.
Curtis et al's No. 1 Green, C NW Sec. 33-19-6w ..... Location.
Danciger et al's No. 1 Bell, C SW Sec. 16-19-8w ..... Location.
Langston et al's No. 1 Shumway, C SW Sec. 2-20-9w ... Location.
McCullough et al's No. 1 Williams, C NE Sec. 35-20-8w .. Rig.

RILEY COUNTY

Arkansas Fuel Oil Co.'s No. 1 Martin, SE NE SW Sec. 24-8-4 ..... Rig.
Grey et al's No. 1 Smith, NE SE Sec. 30-6-6 ..... Shut down 1,970 ft.
Derby & Shaw's No. 1 Lindstrom, NE cor. Sec. 32-7-5e .. Drlg. 2,246 ft.

RUSSELL COUNTY

Cress & Hacke's No. 1 Unknown, SE cor. Sec. 6-13-12w .. Rig on ground.
Midwest Exploration's No. 1 Benson, SW cor. Sec. 4-14-15w ..... Drlg. 525 ft.
Prairie Oil & Gas Co.'s No. 1 Brungardt, C NW SE NW Sec. 31-12-15w ..... Drlg. 1,985 ft.
Empire and Prairie's No. 1 Bocks, C SE NE NE Sec. 23-15-14w ..... Drlg. 3,353 ft.

ROOKS COUNTY

Kruger et al's No. 1 Stels, NW SE SW Sec. 12-9-16w .. Shut down 50 ft.
Burford-Brim's No. 1 Toxa, Sec. 22-9-17w ..... Shut down.

RUSH COUNTY

Milmac's No. 1 Mohr, C NW Sec. 11-18-16w ..... Drlg. 560 ft.
Sinclair Oil & Gas Co.'s No. 1 Seur, C SW NW NW Sec. 8-18-17w ..... Granite 3,807-46 ft.; abandoned.
Danciger Oil Ref. Co.'s No. 1 Swindt, SW cor. Sec. 22-17-17w ..... Granite 3,850 ft.; abandoned
Central Commercial Oil Co.'s No. 1 Brock, SE cor. SW SW Sec. 13-17-16w ..... Shut down 50 ft.
Danciger Oil Ref. Co.'s No. 1 Pivonka, NE cor. SW NE Sec. 17-19-17w ..... Drlg. 3,905 ft.

SALINE COUNTY

Dixie Oil Co.'s No. 1 Thorstenburg, NW NE Sec. 10-16-3w ..... Drlg. 2,795 ft.
Austin et al's No. 1 Olsen, NW SW SE Sec. 10-15-4w .. Drlg. 2,340 ft.
Templeman's No. 1 Lanbengager, C SW Sec. 20-15-5w .. Drlg. 2,965 ft.
Twin Mounds' No. 1 Weis, NW NE NW Sec. 20-13-4w ..... Shut down 625 ft.

SEDGWICK COUNTY

Tavender et al's No. 1 McLean, SE SW SE Sec. 23-26-1w ..... Rig.
Wentz Oil Corp.'s No. 1 Allison, NE NW Sec. 24-26-2 .... Rig.
Plains Oil Co.'s No. 1 Curry, SE SW SW Sec. 2-27-1w .... Drlg. 3,100 ft.
Fleeger D. F.'s No. 1 Ottaway, C SW NW Sec 16-28-2w ..
C. B. Davis' No. 1 Kinkead, NE cor. Sec. 14-27-1 ..... Underreaming 3,055 ft.
Mariand and Amerada's No. 1 Sensroth, NW cor. Sec. 35-28-4w ..... Drlg. 3,100 ft.; chat 3,078-90 ft.; show oil and water.
Boyle's No. 1 Sandusky, NW NE SE Sec. 34-26-1w .... Drlg. 2,710 ft.
G. W. Mariand's No. 1 Huggins, SE NW SW Sec. 30-27-2 ..... Show water 2,958-70 ft.; 70 bbls. oil and 50 bbls. water.
Johnson & Marshall's No. 1 Roy, NE cor. SE SW Sec. 23-29-1w ..... Hole full water 3,854-59 ft.; abandoned 3,860 ft.
Lario O. & G. Co.'s No. 1 Teachorff, NE cor. SW Sec. 27-29-1w ..... Drlg. 3,710 ft.
Barnett O. & G. Co.'s No. 1 Davidson, NW cor. NW SW Sec. 27-26-1e ..... Shut down 3,007 ft.
Kellar & Lewis' No. 1 Buckles, NW cor. SE Sec. 3-28-1w .. Fishing 975 ft.
Twist et al's No. 1 Joseph, CNL SW SE Sec. 4-25-1w .... Abandoned 1,980 ft.
Washabaugh et al's No. 1 Harrison, NW cor. NE NE Sec. 3-26-2w ..... Drlg. 3,421 ft.
LaFont et al's No. 1 Carlton, C SE SE SW Sec. 24-28-1e .. Shut down 1,685 ft.

SHAWNEE COUNTY

Jenkins & Scott's No. 1 Unknown, NW NE Sec. 28-10-15 ..... Rig.
Jenkins & Scott's No. 1 Haden, NE SE Sec. 8-12-14 .... Drlg. 750 ft.
Omar O. & G. Co.'s No. 1 Allen, SE NE NW Sec. 2-11-14 ..... Drlg. 2,295 ft.

SHERIDAN COUNTY

Mandalin O. & G. Co.'s No. 1 Unknown, C SE SW SW Sec. 27-7-26w ..... Spudded; shut down.

SHERMAN COUNTY

A. L. Henson et al's No. 1 Murry, NE cor. SE NW Sec. 22-7-40w ..... Shut down 3,035 ft.

STAFFORD COUNTY

Phillips Petroleum's No. 1 Houghton, SW cor. Sec. 20-21-12w ..... Shut down 50 ft.

STEVENS COUNTY

McKenna's No. 1 Unknown, C NW NW Sec. 29-33-36w .. Shut down 50 ft.
Trees Oil Co.'s No. 1 Thompson, C NE SW Sec. 3-35-38w .. Shut down 500 ft.
W. Sidwell et al's No. 1 Kelly, SW cor. NE Sec. 16-34-38w ..... Shut down 1,320 ft.

SMITH COUNTY

Phillips Pet.'s No. 1 Clydesdale, SE NW Sec. 23-5-14w .... Drlg. 2,770 ft.

SUMNER COUNTY

Kingwood Oil Co.'s No. 1 Stayton, C NE Sec. 18-31-2w ... Spudding.
Slick et al's No. 1 Pessel, NW cor. Sec. 33-31-1w ..... Spudding.
Lario O. & G. Co.'s No. 1 Osborne, NE SE Sec. 21-30-1w ..... Drlg. 1,190 ft.
E. K. Carey & Larado Oil Co.'s No. 1 Welsch, SW SE Sec. 9-34-1e ..... Shut down 2,340 ft.
Mid-Continent Pet. Corp.'s No. 1 Clark, SE cor. Sec. 31-34-3w ..... Drlg. 4,480 ft.
Shell Pet. Corp.'s No. 1 Armstrong, NE cor. Sec. 12-33-1e. Drlg. 2,434 ft.
Davidson et al's No. 1 Strickland, SW cor. SE Sec. 12-35-1w ..... Rig.

TREGO COUNTY

Dixie & Amerada's No. 1 Reitmayer, C NE NE Sec. 19-14-21w ..... Rig.
Prairie Oil & Gas Co.'s No. 1 Kutina, C NE SW NE, Sec. 29-15-21w ..... Drlg. 1,460 ft.
Producers & Refiners Corp.'s No. 1 Kingsley, C SE NW NW Sec. 24-14-21w ..... Spudding.
Phillips Pet. Co.'s No. 1 Spitz, SE cor. Sec. 24-12-25w .... Drlg. 1,145 ft.
Mid-Kansas' No. 1 Ridgeway, NE SW Sec. 28-12-21w .... Drlg. 2,985 ft.
Day et al's No. 1 Gugler, SW NE NE Sec. 36-12-21w ..... Shut down 50 ft.
Day et al's No. 1 Unknown, NE NW SW Sec. 2-11-21w .... Shut down 2,910 ft.

WASHINGTON COUNTY

McCool & Vincent's No. 1 Linn, NW cor. NE Sec. 27-4-3. Shut down 2,300 ft.

WALLACE COUNTY

Morton & Entyre's No. 1 Parker, SE cor. NW SW Sec. 20-13-41w ..... Spudded; shut down.

WILDCAT OPERATIONS IN NEBRASKA

FRANKLIN COUNTY

U. R. Drlg. Co.'s No. 1 Brunkle (twin well), C NW SW NE Sec. 2-3n-13w ..... Rig.

CHASE COUNTY

Chase Pet. Co.'s No. 1 Ingold, C NE Sec. 24-6n-38w .... Drlg. 4,080 ft.

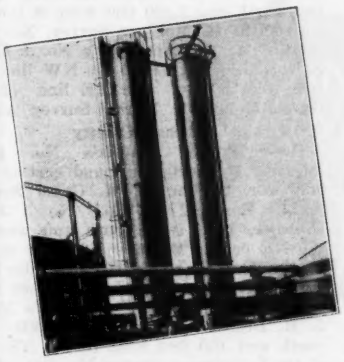
FURNAS COUNTY

Southwestern Pet. Corp. of Nebraska's No. 1 Montague, SE SW SW Sec. 25-1n-22w ..... S. D. 1,750 ft.
Graham Bros.' No. 1 Edwards, NW SW Sec. 13-2n-22w .. Drlg. 3,250 ft.

WEBSTER COUNTY

Mid-States Exploration Co.'s No. 1 Platt, C SE one-half Section 2-1n-11w ..... Shut down 555 ft.

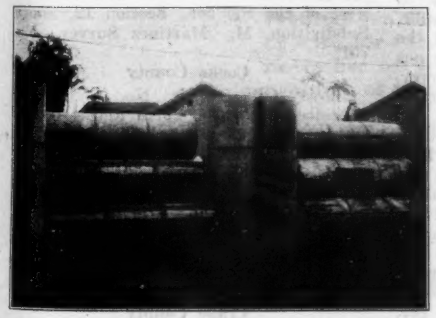
TANKS
long in service and savings and short in upkeep



Two huge ARMCO Ingot Iron gas coolers, at the Hamilton By-Products Coke Company, Hamilton, Ontario.

Two 2000-bbl. Gantz ARMCO Ingot Iron tanks, The Apex Oil Company, Ltd., Fyzabad, Trinidad, B.W.I.

Oil Storage Tanks of a large Ohio refinery, roofed with ARMCO Ingot Iron. No repairs or replacements in 17 years.



The Texas Company of Sao Paulo, Brazil, ordered these ARMCO Ingot Iron underground tanks for use in its South American distribution.

YOUR tanks made of durable ARMCO Ingot Iron are certain to bring those savings you've long desired. The twenty-two years' performance record of this uniform pure iron reveal it as the metal of low cost per year of service.

For roofs and bottoms of crude oil storage tanks, refinery storage tanks, agitators, oil flow tanks, underground storage tanks, tank cars, and other containers, you, too, will find ARMCO Ingot Iron the long-lasting, inexpensive metal.

Other advantages of ARMCO Ingot Iron are its pronounced workability and weldability. The pure iron responds readily, hot or cold, and unites in sound, dense welds.

Submit your tank problems to any of the offices listed below. They will gladly work with you to obtain efficiencies and economies.

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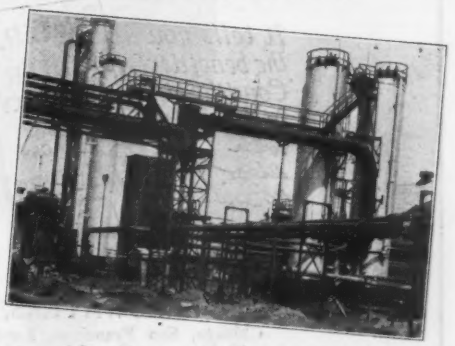
ARMCO Ingot Iron

New type of ARMCO Ingot Iron waterless gas holder, in service of Hamilton Coke & Iron Company, Hamilton, Ohio.

An ARMCO Ingot Iron condenser box has served long and economically in Bristow, Okla.



The primary coolers, benzol washers, and final cooler, at the Hamilton Coke & Iron Company, Hamilton, Ohio, were made of ARMCO Ingot Iron plates for dependable rust-resistance and to consequent low-cost service.

ARMCO Ingot Iron agitator, in continuous service for 17 years, at Utah Oil Refining Company, Salt Lake City.

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Be sure to visit the ARMCO Booth at the Tulsa Exposition. Here you will find much of interest and enlightenment—typical ARMCO Ingot Iron installations that have given long service and satisfaction to producers, refiners, and marketers, as well as much informative data on the advantages and properties of this pure, corrosion-resistant iron. Too, you'll like the friendly, helpful spirit which pervades the exhibit and its attendants.

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[Fort Worth Steel & Machinery Co.]

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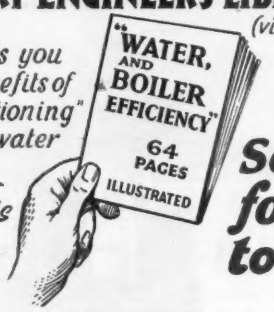

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See Classified Wants on Pages 220-221

NEW LOCATIONS IN TEXAS PANHANDLE AND NORTH AND WEST TEXAS FIELDS

TEXAS PANHANDLE

Carson County

Empire Gas & Fuel Co.'s No. 1 J. W. Fields, 1,650 feet south and west of the NE cor., Section 13, Block 7, I.&G.N. Survey. The Texas Company's No. 4 T. D. Lewis, 330 feet north and east of the SW cor. NW NE, Section 115, Block 4, I.&G.N. Survey. The Texas Company's No. 2 J. L. Noel, 990 feet north and 330 feet east of the SW cor. NW, Section 187, Block 3, I.&G.N. Survey.

Gray County

B. Dunlop's No. 4 J. S. Morse, 330 feet north and east of the SW cor. SW, Section 17, Block A-9, H.&G.N. Survey. Humble Oil & Refining Co.'s No. 1 A. Chapman, 330 feet south and west of the NE cor. SW, Section 69, Block 25, H.& G.N. Survey. Shamrock Oil & Gas Co.'s No. 3 G. H. Saunders (Plains), 330 feet north and east of the SW cor. E half SE, Section 4, Block 1, A.C.H.&B. Survey. Skelly Oil Co.'s No. 1 A. Chapman, 330 feet north and west of the SE cor. S half NW, Section 69, Block 25, H.&G. N. Survey. The Texas Company's No. 15 G. H. Saunders, 330 feet north and west of the SE cor. W half SE, Section 4, Block 1, A.C.H.&B. Survey. The Texas Company's No. 4 M. A. Shaw, 2,592 feet north and 284 feet east of the southwest corner of the east 279 acres of Section 5, Block 1, A.C.H.B. Survey.

NORTH CENTRAL AND WEST TEXAS

Archer County

Gwynn-Boyd Drilling and others' No. 6 A. D. Thompson, 1,050 feet south and 450 feet east of the northwest corner of Lot 16, Section 20, A.T.N.C.L. Survey. F. P. Cullum's No. 1 Falls County School Land, 200 feet north and east of the SW cor., Section 10, Falls County School Land, A-130. Cullum and Prairie Oil & Gas Co.'s No. 2 Falls County School Land, 150 feet north and 672 feet east of the SW cor., Section 17, Falls County School Land, A-130. Humble Oil & Refining Co.'s No. 8 A. M. Kunkel, 150 feet north and 1,950 feet west of the southeast corner of their 40-acre lease out of Section 3, B.B.B.&C. Survey, A-51. Long and The Texas Company's No. 1 G. W. Dominey, 1,913 feet north and 2,655 feet east of the SW cor., Section 108, Club Ranch Subdivision. M. & V. Oil Co.'s No. 1 H. Kunkel, 150 feet north and east of the southwest corner of the north 40 acres of the west 80 acres of the H. Kunkel 252-acre tract out of the G. W. Stell Survey, A-381. Pandem Oil Corp.'s No. 1 E. A. Hausler, 150 feet south and east of the northwest corner of the east 10 acres of the north 20 acres of the northwest 40 acres (square) of the east A. Hausler 167-acre tract out of the N. Standerford Survey, A-394.

Brown County

Bowers and others' No. 2 T. G. and R. W. Giddings, 150 feet north and 2,725 feet east of the southwest corner of the J. J. Clelland Survey, No. 63. G. A. Buder, trustee's No. 4 N. E. Munselle, 150 feet south and 450 feet west of the northeast corner of his 80-acre lease out of the W. Ahrenbeck & Brothers Survey, No. 3, A-20. Gilman & McMurray's No. 7 R. Hickman, 450 feet north and 80 feet east of the SW cor. of their 180.5-acre lease out of the Thomas Benson Survey No. 783.

S. Herring and others' No. 2 S. C. Kessler, 150 feet north and east of the SW cor. of the east 20 acres of the north 90 acres of the S. C. Kessler tract out of Section 42, H.T.&B. S. B. Owens and others' No. 4 S. B. Cannon, 550 feet north and 150 feet west of the SE cor. of the S. B. Cannon 200-acre tract out of the W. Ahrenbeck & Brother Survey No. 3, A-20. Paramount Oil Royalties Co.'s No. 1 J. W. Shore, 150 feet north and east of the SW cor. of the north 30 acres of the west 60 acres of the J. W. Shore 132.5-acre tract out of the C. B. Bannister Survey No. 627. Paramount Oil Royalties Co.'s No. 1 J. A. Willis, 150 feet north and 300 feet west of the SE cor. NW of the J. A. Willis 160-acre tract out of Section 2, S.A.&M.G. A-1,369. E. L. Smith Oil Co.'s No. 1 S. C. Kessler, 150 feet north and west of the SE cor. of the west 70 acres of the north 90 acres of the S. C. Kessler tract out of Section 42, H.T.&B. E. L. Smith Oil Co.'s No. 4 H. M. Truehart, 1,950 feet north and 150 feet east of the SW cor. of the M. B. Lamar Survey No. 638. Young Brothers and Alexander's No. 12 Kilgore Brothers, 2,750 feet north and 1,100 feet west of the SE cor. of the H. McClure Survey, No. 152, A-675. A. R. Eppenauer's No. 1 E. V. Shields, 750 feet SE of the NW line and 150 feet SW of the NE line of the Garcia-Montez & Duran Survey A-373.

Coleman County

Broderick & Calvert's No. 4 L. Weaver, 150 feet south and east of the NW cor. of Lot 20, A. Gabel Survey 3,271. Eastland Oil Co.'s No. 1 J. J. Crowder, 150 feet south and west of the NE cor. of the west 40 acres of the north 100 acres of the J. J. Crowder 240-acre tract out of the J. R. Woods Survey No. 483. A. R. Eppenauer's No. 1 J. R. Brooks (Henderson), 1,000 feet south and 150 feet west of the NE cor. of the L. Johnson Survey No. 480. Midwest Exploration Co.'s No. 5 I. Keeney, 1,100 feet south and 150 feet east of the NW cor. of their 100-acre lease out of the R. Cochran Survey No. 269. Midwest Exploration Co.'s No. 6 I. Keeney, 1,501 feet south and 150 feet east of the NW cor. of their 100-acre lease out of the R. Cochran Survey No. 269. Permian Oil and Gibson-Johnson's No. 2 J. J. Crowder, 515 feet south and 150 feet west of the NE cor. of the west 20 acres of the east 60 acres of the north 100 acres of the J. J. Crowder 240-acre tract out of the J. H. Woods Survey No. 483. L. Smith's No. 5 J. P. Morris, 126 feet south and 1,548 feet west of the NE cor. of the J. H. Woods Survey No. 483. L. Smith's No. 6 J. P. Morris, 126 feet south and 848 feet west of the NE cor. of the J. H. Woods Survey No. 483. Tower & McKanna's No. 5 J. J. Crowder, 128 feet south and 150 feet east of the NW cor. of their 40-acre lease out of the J. H. Woods Survey No. 483. Tower & McKanna's No. 6 J. J. Crowder, 513 feet south and 150 feet east of the NW cor. of their 40-acre lease out of the J. H. Woods Survey No. 483. White Eagle Oil & Refining Co.'s No. 3 J. P. Morris, 1,146 feet south and 250 feet west of the NE cor. of Lot 25, William Webber Survey No. 722.

White Eagle Oil & Refining Co.'s No. 20 J. P. Morris, 150 feet north and 110 feet west of the SE cor of Lot 26, William Webber Survey No. 722. White Eagle Oil & Refining Co.'s No. 24 J. P. Morris, 150 feet north and 410 feet west of the SE cor. of Lot 26, William Webber Survey No. 722. Anzac Oil Co. and Atlantic Oil Purchasing Co.'s No. 1 Tholl Oil Co., 1,250 feet north and 700 feet west of the SE cor., Section 12, South Subdivision, M. Martinez Survey No. 751.

Cooke County

Lloyd Oil Corp.'s No. 5 D. B. Wheelock, 480 feet north and 410 feet east of the SW cor. of the C. Underwood Survey A-1073. Simmons-Crowley and others' No. 3 D. B. Wheelock. 150 feet south and 1,150 feet west of the NE cor. of the W. Teal Survey A-1,036. C. J. Mellon and others' No. 1 T. J. Able, 1,950 feet south and 1,350 feet west of the most northerly NE cor. of the J. H. Jossey Survey A-536.

Crane County

Tidal Oil Co.'s No. 2 University Land-D, 330 feet south and west of the NE cor NW SW, Section 34, Block 30, University Land.

Eastland County

Hoffman & Page's No. 3 I. B. Foster-B, 930 feet north and 160 feet west of the SE cor. SW NW, Section 27, Block 2, H.&T.C. Arab Gasoline Corp.'s No.

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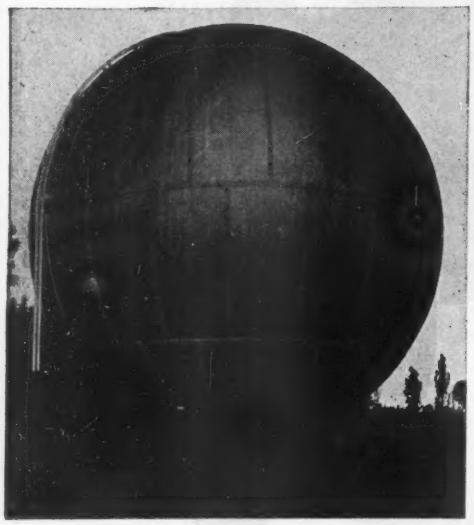

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Gaines County

Louisiana Oil Refining Co.'s No. 1 B. B. Ralph, 1,320 feet north and east of the SW cor. Section 7, Block A-28, Public School Land.

Glasscock County

Fuhrman Petroleum Corp.'s No. 1 L. S. McDowell and others, 330 feet north and 1,650 feet west of the SE cor., Section 24, Block 34, T-2-S, T.&P. Sun Oil Co.'s No. 3 Hart Phillips, 330 feet north and 2,310 feet west of the SE cor. Section 14, Block 33, T-2-S, T.&P.

Howard County

Humble Oil & Refining Co.'s No. 5 H. R. Clay, 330 feet north and 990 feet east of the SW cor., Section 138, Block 29, W.&N.W. R.R. Merrick-Bristow Oil Co.'s No. 12 A. J. Hooks, 250 feet south and 1,980 feet east of the NW cor. Section 140, Block 29, W.&N.W. R.R. Moody Oil Corp.'s No. 23 Dora Roberts-B 990 feet south and east of the NW cor., Section 137, Block 29, W.&N.W. R.R. Its No. 24, D. Roberts-B, 1,650 feet south and 990 feet east of the NW cor. of Section 137, Block 29, W.&N.W. R.R. Its No. 25 D. Roberts-B, 990 feet south and 1,650 feet east of the NW cor., Section 137, Block 29, W.&N.W. R.R. Its No. 26 D. Roberts-B, 1,650 feet south and east of the NW cor., Section 137, Block 29, W.&N.W. R.R. Its No. 27 D. Roberts-B, 330 feet south and 430 feet east of the NW cor., Section 137, Block 29, W.&N.W. R.R. Its No. 28 D. Roberts-B, 330 feet south and 990 feet east of the NW cor., Section 137, Block 29, W.&N.W. Its No. 29 D. Robers-B, 330 feet south and 1,650 feet east of the NW cor. Section 137, Block 29, W.&N.W. R.R. Its No. 30 Dora Roberts-B, 1,980 feet south and 660 feet east of the NW cor., Section 137, Block 29 W.&N.W. R.R. Plymouth Oil Co.'s No. 7 Kloh and others, 2,310 feet south and 330 feet east of the NW cor., Section 5, Block 32, T-2-S, T.&P. Schermerhorn Oil Co.'s No. 1 Kloh & Rumsey, 2,310 feet north and 1,650 feet west of the SE cor. Section 13, Block 33, T-2-S, T.&P. Shell Petroleum Corp.'s No. 2 Kloh & Rumsey, 2,310 feet north and 990 feet west of the SE cor., Section 13, Block 33, T-2-S, T.&P. Ward Oil Co.'s No. 13 D. Roberts, 2,430 feet north and 1,590 feet east of the SW cor., Section 137, Block 29, W.&N.W. R.R. Its No. 14 D. Roberts, 2,430 feet north and 2,010 feet east of the SW cor. Section 17, Block 29, W.&N.W. R.R. Its No. 15 Dora Roberts, 2,430 feet north and east of the SW cor. Section 137, Block 29, W.&N.W. R.R.

Irion County

J. A. Starkweather and others' No. 1 J. H. Lindley, 900 feet north and 150 feet west of the NW cor. Section 1, Gonzales County School Land and located in the J. H. Lindley Survey.

Jack County

Panhandle Refining Co.'s No. 2 Eaton & Danield, 270 feet south and 240 feet west of the NE cor. of the Eaton & Daniels 150-acre tract out of the I. Hughson Survey, A-256.

Palo Pinto County

Bolin & Lindsey's No. 3 M. B. Costello, 250 feet northeast of the SW line and 150 feet southeast of the northwest line of the J. T. Smith Survey A-410.

Pecos County

Cosden Oil Co.'s No. 1 J. A. McDonald, 350 feet south and west of the NE cor. Section 1, H.E.&W.T., A-3,064. Dixie Oil Co.'s No. 1 T. N. McKenzie, 3,300 feet south and 2,025 feet east of the NW cor., Section 15, Block 604, G.C.&S.F. Landreth Production and World Oil Co.'s No. 3 University Land-B, 330 feet north and west of the SE cor. NE NE, Section 13, Block 18, University Land. Their No. 4 University Land-B, 330 feet south and west of the NE cor. SE NE, Section 13, Block 18, University Land. Their No. 5 University Land-B, 330 feet north and west of the SE cor. NE, Section 13, Block 18, University Land.

Merrick & Bristow's No. 1 J. L. Nevill, 1,650 feet north and 330 feet east of the SW cor., Section 42, Block 12, H.&G.N. Mid-Kansas Oil & Gas Co.'s No. 19 Smith & Taylor, 1,956 feet north and 330 feet east of the SW cor., Section 33, Block 194, G.C.&S.F. Red Bank Oil Co.'s No. 1 J. L. Nevill, 330 feet north and east of the SW cor., Section 40, Block 12, H.&G.N. Shell Petroleum Corp.'s No. 2 University Land-C, 330 feet south and east of the NW cor. NW cor. SW NW, Section 31, Block 16, University Land. Its No. 3 University Land-C, 330 feet north and west of the SE cor. SW NW, Section 31, Block 16, University Land. Its No. 4 University Land-C, 330 feet north and east of the SW cor. SW NW, Section 31, Block 16, University Land. Taylor Link Oil Co.'s No. 7 University Land, 330 feet south and west of the NE cor. W half, Section 31, Block 16, University Land.

Schleicher County

G. T. Wilson and others' No. 1 Page, 1,290 feet south and 1,470 feet east of the NW cor., Section 40, Block 1, G.H.&S.A.

Scurry County

Byrd & Harmon's No. 1 J. E. Murphy Jr., 330 feet south and west of the NE cor., Section 114, Block 97, H.&T.C. (shown as Sanger Brothers).

Shackelford County

G. W. Beason and others' No. 1 J. H. Nail, 200 feet south and 2,840 feet west of the NE cor., Section 24, Block 10, E.T. R.R. George Callihan and others' No. 9 J. H. Nail, 660 feet west of the center of Section 133, Block 10, E.T. R.R. Kiser & Grace's No. 1 J. H. Jenkins, 150 feet north and west of the SE cor. SW NW, Section 42, Blind Asylum Land. Manning and other's No. 1 W. P. Newell (Section 12), 450 feet south and 150 feet west of the NE cor. SE NE, Section 12, Block 12, T.&P. Roeser-Pendleton and Humble Oil & Refining Co.'s No. 1 R. M. Titus-C, 2,800 feet south and 174 feet east of the SE cor. Section 914, T.E.&L., and located in the N. Williams Survey.

Stephens County

J. B. Dale,'s No. 3 T. F. Litton, 650 feet north and 150 feet west of the SE cor. SW, Section 68, Block 4, T.&P. F. S. Freeland's No. 1 A. L. Wagley, 300 feet south and east of the NW cor. SW, Section 26, Block 7, T.&P. Nunn & Herman's No. 1 J. A. Langford, 150 feet south and west of the NE cor. SE SE, Section 39, Block 6, T.&P. States Oil Co.'s No. 5 C. E. Sikes, 640 feet north and 450 feet west of the SE cor. Section 84, Block 6, T.&P.

Sterling County

S. B. Owen's No. 1 H. Tweedle, 1,980 feet south and 1,320 feet west of the NE cor., Section 10, Block 6, T.&P.

Sutton County

Independent Oil & Gas Co.'s No. 1 Wilson, 1,650 feet south and 2,310 feet east of the NW cor. Section 30, Block A, G.W.T.&P. Independent Oil & Gas Co.'s No. 1 Allison, 200 feet south and 1,000 feet east of the NW cor., Section 39, Block A, G.W.T.&P.

Upton County

Pure Oil Co.'s No. 2 Ed S. Hughes, 150 feet south and 1,067 feet east of the NW cor. of their 300-acre lease out of the William Teer Survey No. 4, A-806. Texas Pacific Coal & Oil Co.'s No. 1 J. H. Shirk, 330 feet north and west of the SE cor., Section 1, Block 3, M.K.&T. White Eagle Oil & Refining Co.'s No. 2 Ed S. Hughes, 150 feet north and east of the SW cor. of their 80-acre lease out of the William Teer Survey No. 4, A-806.

Val Verde County

Phantom Oil Co.'s No. 1 Babb Brothers, 1,320 feet north and west of the SE cor., Section 44, Block D-8, E.L.&R.R.

Wichita County

American Refining Co. Props., No. 1 L. Morgan (Couper), 750 feet north and 826 feet west of the SE cor. of the L. Morgan 151.6-acre tract out of the

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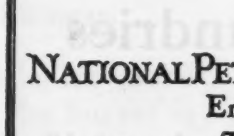

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L. Meadows Survey A-785, being 750 feet north and 150 feet west of the SE cor. of their 7.6-acre lease. Bateman & Dingee's No. 1 G. L. Woodard, 150 feet south and west of the NE cor. W half NW, Section 290, Waggoner Colony Subdivision. Coffey & Brewer's No. 1 C. H. Whittenbach, 150 feet south and east of the NW cor. SE, Section 303, Waggoner Colony Subdivision. Holbrook & Wood's No. 32 Kemp & Kempner, 1,200 feet south and 450 feet west of the SE cor., Block 81, Kemp Wichita Valley Land and located in Block 82. Humble Oil & Refining Co.'s No. 1 Burt & Griffith, 457 feet north and 401 feet west of the SE cor. N half, Section A, Tarrant County School Land, A-282. T. F. Hunter's No. 7 J. L. and T. J. Waggoner, 200 feet south and 150 feet east of the NW cor. Lot 1, H. George Survey A-454. McCarty Oil & Jackson's No. 12 T. F. Mitchell, 150 feet north and 400 feet west of the SE cor. Lot 4, Mitchell Subdivision, P. Castleman Survey A-36. W. B. Omohundro and others' No. 22 J. R. Pace, 1,050 feet south and 450 feet east of the NW cor. of their 60-acre lease out of the R. J. Scott Survey A-255. W. B. Omohundro and others' No. 23, J. R. Pace, 750 feet south and east of the NW cor. of their 60-acre lease out of the R. J. Scott Survey A-255. Sheldon & Jamison's No. 1 A. Volkart, 150 feet south and east of the NW cor., Section 309, Waggoner Colony Subdivision. Sheldon and Van Mex Oil Co.'s No. 1 G. L. Woodard, 150 feet south and west of the NE cor., Section 290, Waggoner Colony Subdivision. Tucker Oil Co.'s No. 27 J. Hirschi, 150 feet south and west of the NE cor. of their 160-acre lease out of the D. Cowan Survey A-43. Tucker Oil Co.'s No. 28 J. Hirschi, 1,900 feet south and 625 feet west of the NE cor. of the D. Cowan Survey A-43.

United Production Co. and others' No. 4 Allen & Kemp-F, 479 feet north and 350 feet east of the SW cor., Block 28, Kemp Wichita Valley Land. White Brothers and Jackson's No. 8 T. F. Mitchell-B, 500 feet south and and 1,200 feet east of the NW cor., Lot 7, Mitchell Subdivision, P. Castleman Survey A-36. Their No. 9 T. F. Mitchell-B, 150 feet south and 1,300 feet east of the NW cor., Lot 7, Mitchell Subdivision, P. Castleman Survey A-36.

CORRECTIONS

In Brown County—Riordan and others' No. 2 L. C. Riordan, 300 feet north and west of the SE cor. of the L. C. Riordan 194-acre tract out of the C. B. Jennings Survey No. 353. E. L. Smith Oil Co.'s No. 3 H. M. Truehart, 1,650 feet north and 150 feet east of the SW cor. of the M. B. Lamar Survey No. 638. Van Mex Oil Co.'s No. 7 R. Hickman-D, 150 feet north and 478 feet east of the SW cor. of the J. McGloin Survey.

In Carson County—Osborne and others' No. 2 F. E. Percival, 990 feet north and 330 feet west of the SE cor. E half NE, Section 199, Block 3, I.&G.N.

In Eastland County—A. R. Forster and others' No. 3 J. E. Spencer, 450 feet north and 150 feet east of the SW cor. NE, Section 29, Block 2, H.&T.C.

In Howard County—Moody Oil Corp.'s No. 19 Dora Roberts-E, 1,980 feet south and 660 feet west of the NE cor., Section 136, Block 29, W.&N.W.R.R.

In Pecos County—R. E. Moore's No. 1 R. W. Arnold, at the center of the E half SW, Section 18, Block 1, H.&T.C. Phillips Petroleum Co.'s No. 2 W. Courtney, 660 feet south and east of the NW cor., Section 78, Block OW, T.M.R.R. Sun Oil Co.'s No. 1 University Land (Carlson), 990 feet south and 1,350 feet west of the NE cor., Section 34, Block 18, University Land. Sun Oil Co.'s No. 2 University Land, 330 feet south and 330 feet east of the NW cor., Section 8, Block 17, Unversity Land.

In Wheeler County—Martin & Debous' No. 1 J. Pitsch, at the center of the SE SW Section 100, Block 23, H.&G.N.

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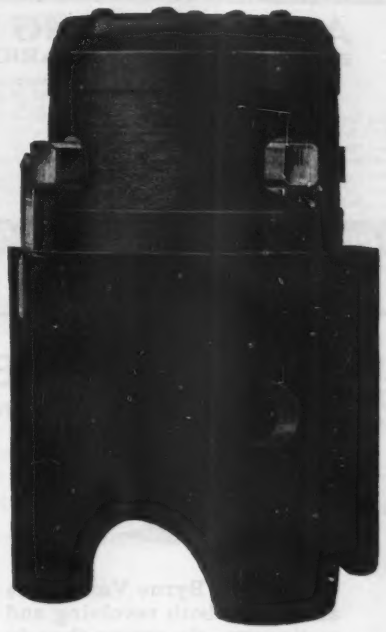

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In the Larkin Regular Bottom, the legs are short, allowing the pump to rest as near the bottom of the hole as possible and still obtain the necessary suction to remove the greatest amount of sand and sediment quickly.

BIT BOTTOM

This bottom is used for drilling and breaking the sand loose. Its chisel shape design is unique, prevents sticking, and allows successful operation in tightly packed sands.

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Acme Tool Company, Breckenridge, Texas	Great Northern Tool & Supply Co., Kevin, Mon.	Magner Supply Company, Saginaw, Mich.
Acme Tool Company, Albany, Texas	Great Northern Tool & Supply Co., Kemmerer, Wyo.	Midway Tool Company, Mt. Pleasant, Mich.
Acme Tool Company, Breenwood, Texas	Great Northern Tool & Supply Co., Cody, Wyo.	Atha Supply Company, Zanesville, Ohio

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The arrow points to one of the gills of the Byrne Revolving Ventilators. These slits keep it on an even keel while revolving and provide just the right amount of suction.

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Revolving Ventilator built light, strong and compact as an airplane.

The Byrne Stationary Ventilator. Note the size of the weather guard and its sturdy construction.

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CRANE

CRANE VALVES AND FITTINGS KEEP PACE WITH ADVANCING INDUSTRIAL NEEDS

Oil Co.'s No. 20 Kemp & Kempner, 450 feet south and 750 feet west of the SE cor. of Block 81, Kemp Wichita Valley Land and located in Block 82.

Recent Patents

1,680,353. Apparatus for the Fractional Extraction of Petroleum Hydrocarbons With Alcohol. Theodore A. Werkenthin, Lima, Ohio, assignor to the Solar Refining Co., Lima, Ohio, a corporation of Ohio. Original application filed November 19, 1924, Serial No. 750,783. Divided and this application filed November 4, 1925. Serial No. 66,727. 4 claims. (Cl. 196—13.)

1. In an apparatus for extracting hydrocarbons with an alcohol, the combination in operative relation of an extractor-tank having means for introducing alcohol, means for withdrawing alcohol therefrom, means for introducing a hydrocarbon oil, and means for withdrawing a hydrocarbon oil after extraction with alcohol; an extract alcohol-still for recovering alcohol and hydrocarbon, a settling chamber intermediate the extractor-tank and the extract alcohol-still provided with means for receiving an alcoholic extraction-product from said extractor tank and means for conducting the extraction-product after settlement into the alcohol extract-still; a combined alcohol storage and dehydrator tank having means for conducting the hydrated alcohol to said extractor-tank; and an alcohol condenser having means for receiving uncondensed alcohol from the extract alcohol-still, and means for conducting condensed undehydrated alcohol to the storage and dehydrator-tank.

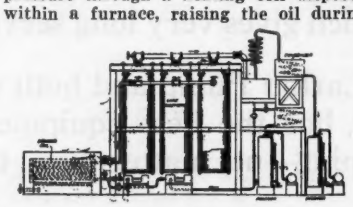
1,681,638. Refining Hydrocarbon Oils. Hiram J. Halle, New York, N. Y., assignor to Universal Oil Products Co., Chicago, Ill., a corporation of South Dakota. Filed May 12, 1920, Serial No. 380,762. Renewed February 12, 1927. 3 claims. (Cl. 196—36.)

3. The step in a process for refining hydrocarbons which comprises passing the hydrocarbons being treated while in vaporous form through a sulphuric acid solution in excess of concentration of 20% and not exceeding 55%.

HOLD IN LIQUID PHASE

1,729,307. Process for Treating Hydrocarbons. Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Co., a corporation of South Dakota. Filed February 26, 1920. Serial No. 361,520. 2 Claims. (Cl. 196—58.)

1. A process for converting heavy hydrocarbon oils into lighter hydrocarbon oils comprising advancing a stream of heavy hydrocarbon oil under an applied pressure through a heating coil disposed within a furnace, raising the oil during



its passage through said heating coil to a cracking temperature in excess of 800 degrees Fahrenheit while maintained under superatmospheric pressure sufficient to prevent material destructive distillation of the oil in the heating coil, delivering the highly heated oil from said coil to an enlarged zone, releasing superatmospheric pressure from the oil delivered to said enlarged zone, thus effecting destructive distillation of the oil and substantially a complete separation of the oil into vapors and a relatively dry coke-like residue, removing the vaporous constituents from said enlarged zone, subjecting the vaporous constituents to reflux condensing action to remove therefrom all insufficiently converted materials, continuously supplying a stream of such insufficiently converted materials while in a heated condition under a mechanically imposed pressure to the stream of oil advancing through said heating coil.

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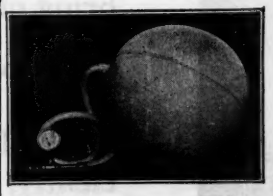

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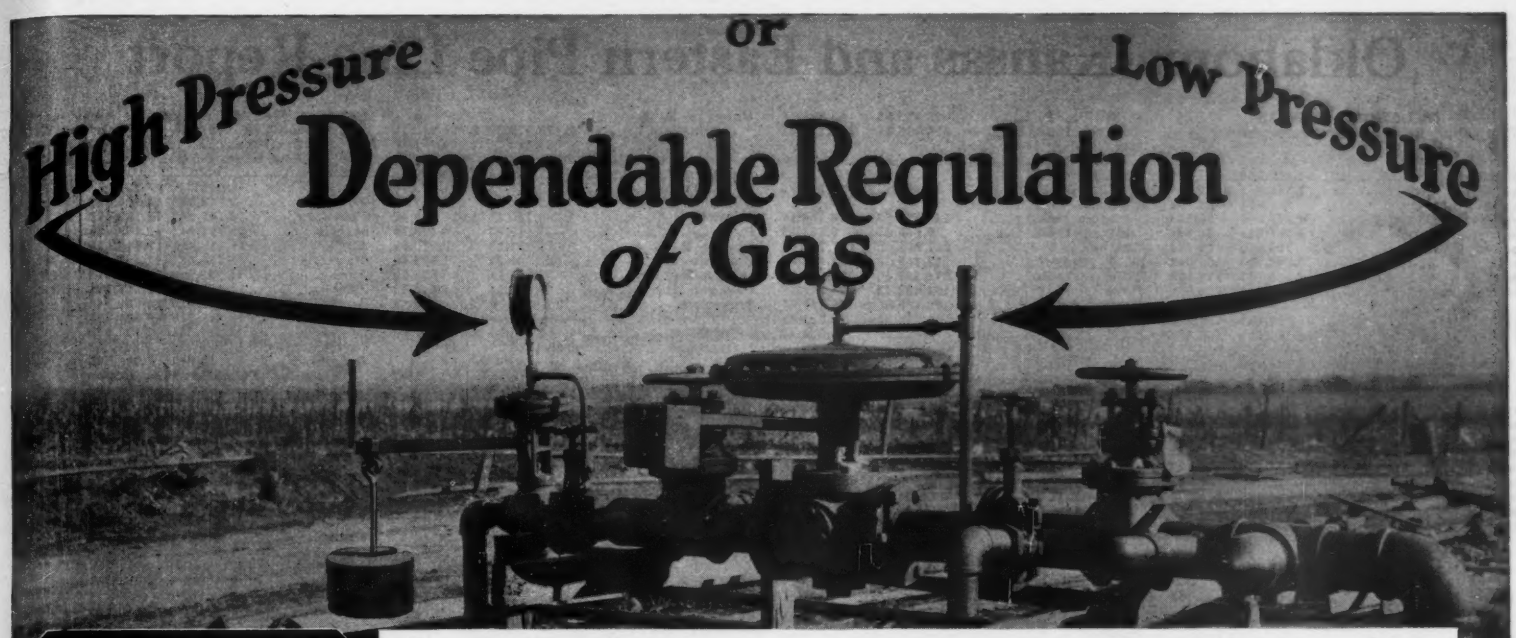
The Oil and Gas Journal
Tulsa, Okla.
CLASSIFIED WANTS



CF

GAS REGULATORS, to be dependable, must be able to cope with many varying factors. With quality of workmanship, of design and of materials there can be no safe compromise. Regulators of proven merit in these, and in all other characteristics that influence their ability to function reliably under all sets of possible conditions, are the only kind of regulators that can satisfy in all services entrusted to their efficiency. This leads to C-F Regulation—the standard control system for natural gas in all fields.

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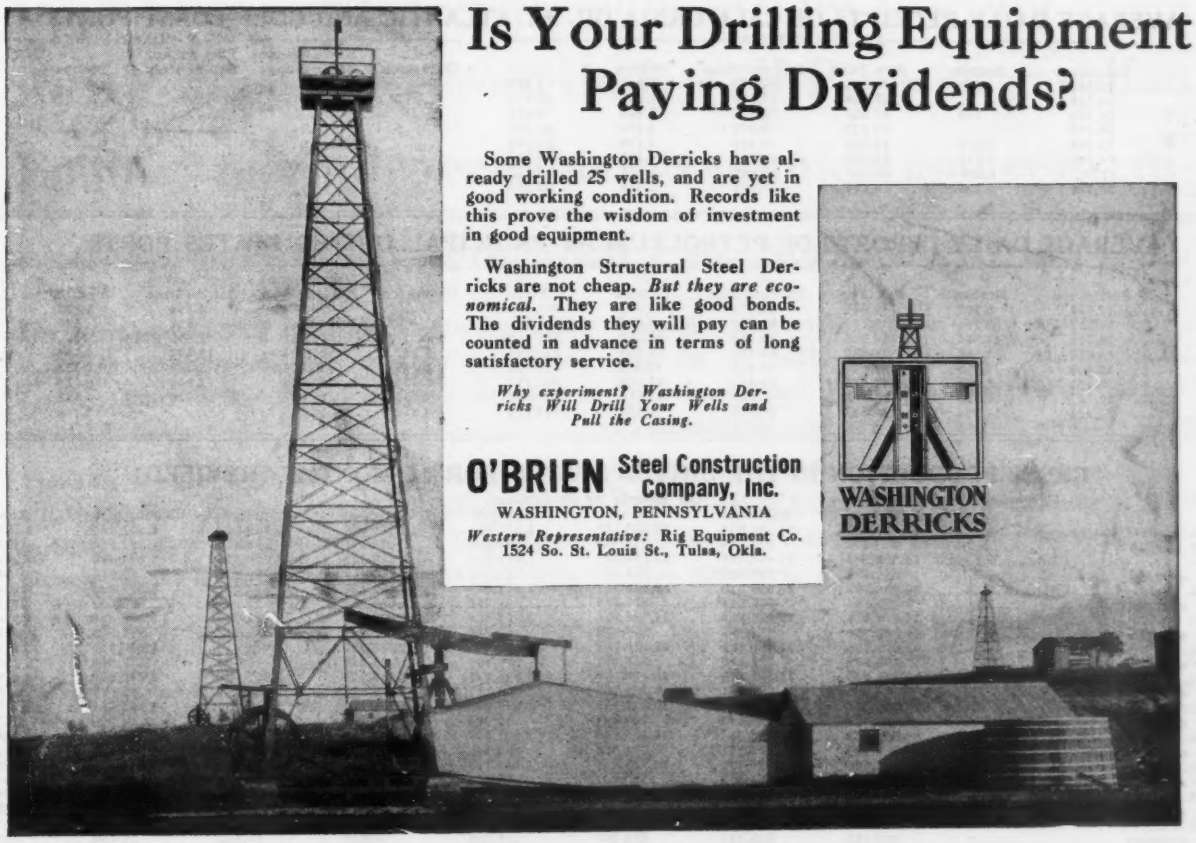

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WASHINGTON DERRICKS

Oklahoma-Kansas and Eastern Pipe Line Report

OKLAHOMA-KANSAS
Pipe Line Statement for July

Runs

	Month	Dly. av.
Prairie P. L. Co.*	4,867,000	157,000
Gulf P. L. Co.	1,943,633	62,698
Texas P. L. Co.	878,464	28,338
Empire P. L. Co.	1,649,005	53,194
Magnolia Pet. Co.	2,261,251	72,944
Cosden P. L. Co.	719,339	23,204
Sinclair P. L. Co.*	3,379,000	109,000
Oklahoma P. L. Co.	3,724,797	120,155
Other companies*	6,820,000	220,000
Total July	26,242,489	846,533
Total June	24,193,700	806,456
Difference	2,048,789	40,077

Shipments

Prairie P. L. Co.†	7,048,297	227,364
Gulf P. L. Co.	1,924,134	62,069
Texas P. L. Co.	1,084,653	34,989
Empire P. L. Co.	1,365,571	44,050
Magnolia Pet. Co.	2,338,228	75,427
Cosden P. L. Co.	1,013,490	32,693
Sinclair P. L. Co.†	3,674,989	118,548
Oklahoma P. L. Co.	3,355,529	108,243
Other companies*	6,603,000	213,000
Total July	28,407,890	916,383
Total June	26,857,711	895,250
Difference	1,550,179	21,133

Stocks

Prairie O. & G. Co.*	36,940,000
Gulf P. L. and Gypsy Oil Co.	9,835,480
Texas P. L. Co.	8,371,562
Empire P. L. Co.	4,350,462
Magnolia P. L. Co.	9,894,115
Mid-Continent Pet. Co.	3,356,327
Sinclair Crude Oil Pur Co.*	20,276,000
Oklahoma P. L. Co.	3,486,975
Carter Oil Co.	10,371,944
Other companies*	10,670,000
Total July	117,552,865
Total June	117,822,300
Difference	269,435

*Estimated. †Prairie and Sinclair shipments include Texas crude oil.

Note—Stocks do not include approximately 6,000,000 bbls. of crude oil held in storage on private tank farms and leases.

EASTERN PIPE LINE REPORT

Runs From Wells

In the following table will be found the regular receipts from wells by various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for July and August:

	July, 1929	Aug., 1929
Nat. Transit	268,968.24	307,546.82
S. W. Pa. P. L.	96,958.15	92,316.86
Eureka P. L.	378,139.18	373,176.67
Buckeye P. L. (Macksburg)	352,288.54	334,947.96
Buckeye P. L. (Cleveland)	12,698.84	13,069.95
Buckeye P. L. (Lima, etc.)	141,314.51	130,364.10
Indiana P. L.	5,565.67	5,572.79
Cumberland P. L.	217,391.68	197,780.44
N. Y. Transit	32,169.25	31,452.26
Tidewater P. L.	284,597.46	280,916.87
Pure Oil	164,484.42	207,822.79
Emery P. L.	72,339.64	73,262.76
Paragon Dev.	16,335.33	13,721.38
Stoll Oil Ref.	5,453.55	5,334.49
Total	2,048,704.46	2,067,286.14
Daily average	66,087.24	66,686.68

Note—Indian Refining Co. also reported other receipts of 402,054.35 bbls. Paragon Refining Co. had other receipts of 164,666.55 bbls. Paragon Development had other receipts of 390.08 bbls.

Petroleum Deliveries

The following tables exhibit the shipments or regular deliveries of various pipe lines in New York, Pennsylvania, West Virginia, Ohio and Kentucky for July and August:

	July, 1929	Aug., 1929
Nat. Transit	448,413.13	433,226.86
S. W. Pa. P. L.	492,117.59	360,915.13
Eureka P. L.	268,871.91	282,805.08
Buckeye P. L. (Macksburg)	239,542.35	185,208.11
Buckeye P. L. (Cleveland)	2,190.55	2,185.04
Buckeye P. L. (Lima, etc.)	1,656,505.17	1,593,076.04
Indiana P. L.	1,426,217.69	1,426,167.56
Cumberland P. L.	200,632.22	201,459.97
Southern P. L.	67,284.36	36,341.20
N. Y. Transit	308,215.81	290,004.27
Northern P. L.	173,766.22	192,966.11
Tidewater P. L.	245,185.79	249,359.87
Pure Oil	163,598.14	214,822.99
Emery P. L.	67,577.88	75,477.85
Paragon Ref.	259,400.21	174,796.43
Paragon Dev.	18,142.33	14,507.08
Total	6,037,661.25	5,733,319.61
Daily average	194,763.27	184,945.79

Indian Refining Co. reported other deliveries of 411,583.39 bbls.

Gross Stocks

The gross stocks held by various pipe lines in the oil producing sections of New York, Pennsylvania, West Virginia, Ohio, Indiana and Kentucky at the close of July and August:

	July, 1929	Aug., 1929
Nat. Transit	692,912.76	689,249.61
S. W. Pa. P. L.	579,475.38	551,844.06
Eureka P. L.	1,209,053.70	1,338,075.04
Buckeye P. L. (Macksburg)	431,010.70	434,154.83
Buckeye P. L. (Cleveland)	71,815.42	58,890.03
Buckeye P. L. (Lima, etc.)	2,470,370.37	2,721,519.25
Indiana P. L.	638,128.50	668,771.87
Cumberland P. L.	559,326.34	556,916.14
Southern P. L.	417,168.75	399,390.51
N. Y. Transit	235,029.71	201,133.36
Northern P. L.	416,713.78	433,718.68
Tidewater P. L.	1,109,732.21	1,028,430.16
Pure Oil	17,189.77	16,303.76
Emery P. L.	12,197.88	10,275.09
Paragon Ref.	22,399.32	11,989.49
Indian Ref.	59,096.91	50,525.66
Paragon Dev.	4,897.15	4,645.76
Tuscarora	265,071.90	264,809.29
Total	9,211,595.35	9,440,642.59
Decrease	290,320.30	229,047.24

Grades of Oil

The following table shows the amount of the different grades of oil held by the eastern pipe lines at the close of July and August showing the gross stocks of the above fields:

	July, 1929	Aug., 1929
Pennsylvania	3,230,774.85	3,279,178.01
Lima	701,522.68	648,102.38
Kentucky	780,445.07	767,210.90
Mid-Continent	4,226,436.12	4,457,893.11
Illinois	272,416.63	288,258.19
Total	9,211,595.35	9,440,642.59

Daily Average Runs

The following table shows the daily average runs of the Pennsylvania, Lima and Kentucky oil fields for the past four years:

	1926	1927	1928	1929
January	55,630	56,209	52,904	51,749
February	60,394	61,298	57,002	51,833
March	61,644	63,747	5[illegible],485	54,252
April	63,019	60,927	56,812	58,444
May	60,580	60,284	62,067	59,902
June	61,121	62,757	58,230	58,833
July	63,206	58,674	57,144	66,087
August	61,815	60,870	57,745	66,687
September	64,639	60,285	53,487	.....
October	161,132	147,080	58,100	.....
November	67,774	57,275	53,565	.....
December	58,755	63,089	52,025	.....

Daily Average Shipments

The following table gives daily average shipments from the Pennsylvania, Lima and other fields for the past four years:

	1926	1927	1928	1929
January	156,056	141,227	146,465	165,721
February	159,488	138,584	167,368	159,387
March	150,239	133,777	158,882	161,474
April	152,374	140,227	172,935	169,737
May	160,998	144,594	180,559	184,281
June	160,267	149,772	188,024	185,404
July	160,045	151,850	189,470	194,782
August	151,929	138,653	192,853	184,946
September	153,915	144,213	194,138	.....
October	161,132	147,036	176,000	.....
November	172,608	150,975	176,898	.....
December	136,428	144,504	173,572	.....

Gross Stocks

In the following table will be found the gross stocks of the various lines of the Pennsylvania, Lima and Kentucky oil fields including oil received from other lines, at the close of each month for the past three years:

	1927	1928	1929
January	9,718,008	12,276,710	7,596,564
February	10,119,162	12,180,419	8,738,831
March	10,794,044	12,239,725	9,002,051
April	11,112,295	11,740,135	8,978,172
May	11,359,381	11,602,468	8,903,566
June	11,493,673	11,287,678	8,921,276
July	11,455,128	10,819,331	9,211,595
August	11,989,115	10,236,743	9,440,642
September	12,212,716	9,660,910	.....
October	12,047,661	9,229,709	.....
November	11,939,740	8,366,553	.....
December	12,340,297	7,539,555	.....

Franklin Pipe Co.

The following table exhibits the condition of the Franklin Pipe Line at the close of business for the months named and not counted in the stocks and averages reported above:

	Runs	Shipments	Stocks
1928—			
June	3,153.03	2,779.02	17,922.54
July	2,902.50	3,628.02	17,197.06
August	2,874.11	2,350.13	17,721.04
September	2,820.31	5,255.42	15,285.93
October	1,289.93	533.89	17,551.93
November	2,663.53	788.47	19,426.99
December	3,053.60	3,167.53	19,436.99
1929—			
January	2,099.90	.....	19,313.04
February	2,469.47	4,873.30	17,009.21
March	3,330.82	3,595.01	16,745.04
April	4,864.07	4,243.59	17,365.52
May	2,688.59	2,455.54	17,598.57
July	2,947.62	3,329.35	4,503.44
August	2,742.73	2,389.47	4,856.74

The Illinois Field

The following table gives the report of the Illinois Pipe Line Co. in Illinois:

Gross stocks, September 1	2,386,943.44
Runs from wells	598,667.57
Other receipts	481,730.34
Regular deliveries	707,229.58
Other deliveries	293,919.13

The amount of Illinois oil run by the Tidewater Pipe Co. in August was 26,684.42 bbls. Deliveries were 29,195.51 bbls. Adding these figures to those of the Illinois Pipe Line Co. makes the runs and deliveries as follows:

1928—	Runs	Deliveries
September	570,307.91	737,292.56
October	626,147.64	626,296.48
November	576,332.88	702,589.98
December	584,633.00	491,517.36
1929—		
January	570,727.38	545,084.51
February	517,330.17	503,387.76
March	723,319.67	536,040.48
April	515,374.37	454,397.96
May	608,981.60	673,812.83
June	568,454.70	513,845.97
July	611,106.79	528,159.44
August	625,351.99	746,425.08

Tidewater Pipe Co., Ltd., also delivered in August, 327,478.83 bbls. Oklahoma oil.

AVERAGE DAILY RECEIPTS OF CALIFORNIA OIL AT ATLANTIC AND GULF COAST PORTS

Average bbls. per day—	ATLANTIC PORTS: Baltimore	Boston	New York	Philadelphia	Others	Total	GULF COAST PORTS: Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total	Total all ports
January	15,838	.....	16,676	11,838	7,938	52,290	.....	.....	.....	.....	5,161	57,451
February	14,214	.....	28,750	17,250	11,607	81,821	.....	.....	.....	.....	3,750	85,571
March	19,903	968	31,258	18,581	7,355	78,065	.....	.....	.....	.....	.....	78,065
April	16,667	.....	32,333	13,233	2,234	64,467	.....	.....	.....	.....	7,333	65,800
May	16,226	2,416	31,326	10,806	2,129	62,903	.....	.....	.....	.....	.....	62,903
June	14,866	3,167	23,100	10,300	6,100	57,533	.....	.....	.....	.....	.....	57,533
July	15,387	4,806	34,290	19,388	2,452	76,323	.....	.....	.....	.....	4,161	80,484
August	20,389	3,129	35,226	18,903	5,548	83,194	.....	.....	.....	.....	12,161	95,355

AVERAGE DAILY IMPORTS OF PETROLEUM AT PRINCIPAL UNITED STATES PORTS

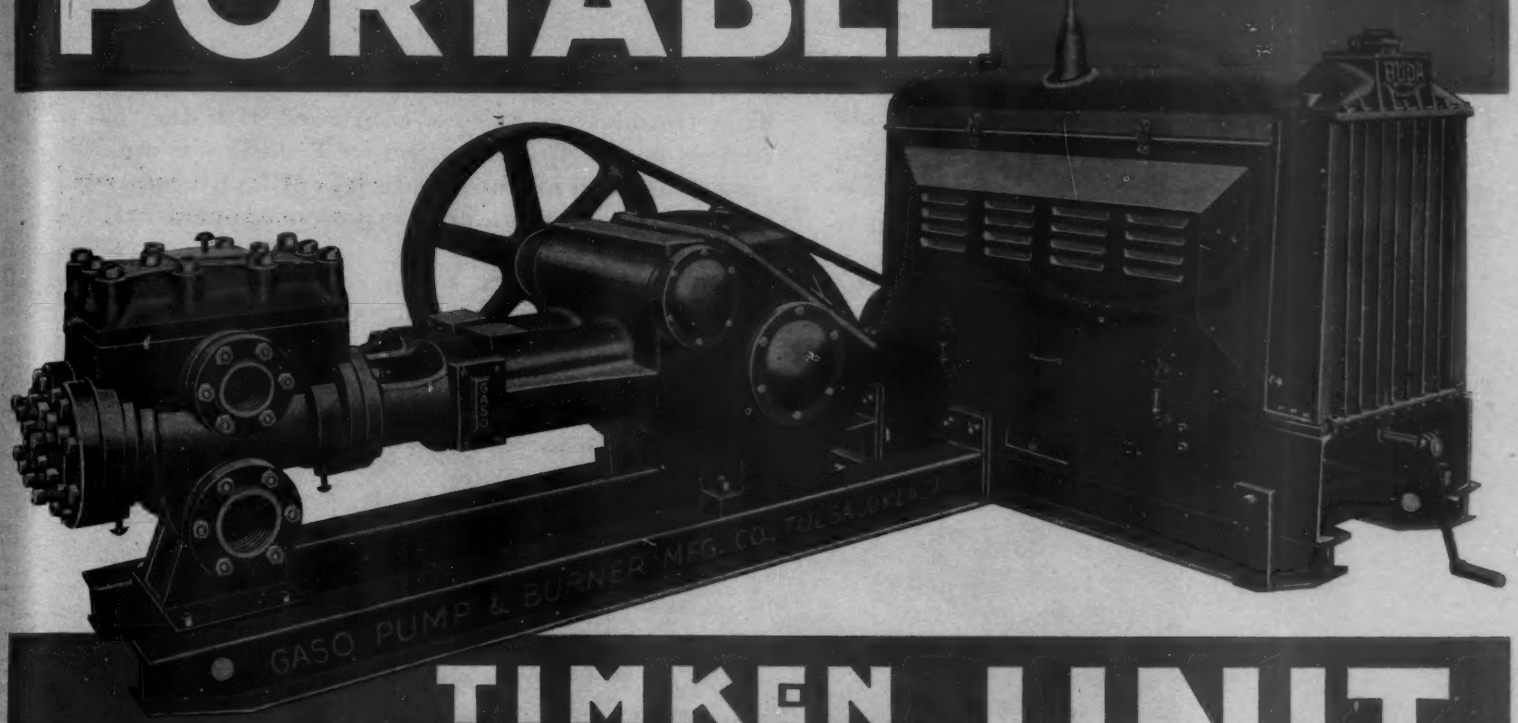
Average bbls. per day—	ATLANTIC PORTS: Baltimore	Boston	New York	Philadelphia	Others	Total	GULF COAST PORTS: Galveston	New Orleans Baton Rouge	Port Arthur Sabine Pass	Tampa	Total	Total all ports
January	11,936	8,903	130,065	34,871	15,709	201,484	.....	34,808	4,098	1,287	40,193	241,677
February	13,750	15,071	135,179	32,750	17,893	214,643	.....	34,357	821	143	35,321	249,964
March	18,548	26,064	146,516	39,162	28,162	257,452	.....	42,581	2,322	.....	44,903	302,355
April	19,733	18,367	137,233	50,267	22,567	248,167	6,867	25,066	10,367	1,500	43,800	291,967
May	29,806	19,258	138,000	49,936	22,322	259,323	6,677	26,323	3,000	1,323	37,323	296,646
June	31,433	8,667	134,600	42,967	18,300	235,967	8,600	22,633	11,300	2,033	45,066	281,033
July	40,097	15,129	111,677	43,420	31,516	241,839	4,774	13,097	9,516	161	26,548	268,387
August	33,387	14,355	162,644	30,936	20,355	261,677	4,226	12,742	.....	1,484	18,452	280,129

GROSS PRODUCTION IN THE UNITED STATES FOR 12 MONTHS (REVISED)

(In barrels of 42 gallons)

1928-29		California	Oklahoma	Texas	Kansas	Arkansas	Louisiana	Rocky Mts.	Eastern	Total
August:	Month	19,444,899	20,840,804	22,339,131	3,147,058	2,711,787	1,989,264	2,561,840	3,556,000	76,590,783
	Daily average	627,255	672,284	720,448	101,518	87,477	64,170	82,640	114,709	2,470,676
September:	Month	18,908,169	22,456,860	21,554,269	3,047,250	2,540,070	1,830,225	2,432,430	3,229,000	75,998,273
	Daily average	630,272	748,562	718,207	101,575	84,669	61,007	81,047	104,300	2,533,279
October:	Month	19,430,992	22,431,071	22,176,853	3,058,460	2,652,484	1,836,221	2,571,822	3,612,000	78,769,903
	Daily average	626,806	755,841	715,376	98,660	85,564	59,233	82,962	116,516	2,540,964
November:	Month	19,907,526	22,078,680	20,791,798	2,977,800	2,476,080	1,801,914	2,388,870	3,348,000	75,770,668
	Daily average	663,584	735,956	693,059	99,260	82,536	60,064	79,629	111,600	2,505,535
December:	Month	21,574,703	22,425,722	22,180,102	2,988,400	2,521,571	1,846,841	2,289,040	3,581,000	79,407,379
	Daily average	695,958	723,410	715,487	96,400	81,341	59,576	73,840	115,516	2,561,528
January:	Month	23,385,939	22,575,874	23,412,226	3,861,641	2,453,526	1,807,887	2,076,070	3,439,000	82,012,163
	Daily average	754,385	728,254	755,233	92,311	79,146	58,318	66,970	110,936	2,645,554
February:	Month	22,300,707	20,464,164	20,816,209	3,567,963	2,154,194	1,569,930	1,965,656	3,113,000	74,941,223
	Daily average	796,454	730,863	743,484	91,356	76,936	56,068	70,202	111,184	2,676,472
March:	Month	24,324,729	20,828,262	24,358,592	3,951,076	2,302,724	1,756,153	2,195,823	3,586,000	82,314,359
	Daily average	784,668	672,202	784,469	95,196	74,314	56,650	70,833	115,677	2,655,302
April:	Month	23,295,060	20,235,290	23,493,097	3,112,740	2,188,680	1,702,479	2,085,030	3,524,000	79,636,376
	Daily average	776,502	674,513	783,103	103,758	72,956	56,750	69,501	117,467	2,654,546
May:	Month	24,053,351	21,346,453	24,489,101	3,665,099	2,220,158	1,713,261	2,252,522	3,879,000	83,617,945
	Daily average	775,915	688,563	789,965	118,229	71,618	55,267	72,662	125,129	2,697,353
June:	Month	24,624,627	20,561,112	24,698,029	3,636,150	2,112,270	1,699,581	2,180,752	3,887,000	83,399,531
	Daily average	820,821	685,371	823,267	121,205	70,337	56,653	72,692	129,567	2,779,984
July:	Month	26,796,627	22,371,925	26,969,989	3,867,157	2,137,047	1,716,488	2,360,836	4,429,200	90,659,739
	Daily average	864,407	721,675	869,997	124,747	68,937	55,370	76,156	142,300	2,924,489
	Total 12 Months	265,047,329	259,635,217	277,279,396	37,870,799	28,471,591	21,270,244	27,360,691	43,193,809	963,118,251
	Daily average	734,376	711,893	759,670	103,756	78,004	58,276	74,961	118,338	2,638,630

PORTABLE



TIMKEN BEARING PUMPING UNIT

GASO Fig. 1508 Pump—mounted on H-Beam skids with V-Rope Drive from Buda 90 H.P. gas or gasoline Engine—offers dependable, economical and convenient operation in temporary or permanent service.

This compact GASO Portable Pumping Unit is easily transported and quickly put into service, thus being an ideal unit for temtorary installations.

Timken main and pinion bearings—continuous tooth Herringbone gears—H-column connecting rod with babbitt-lined, removable bronze shell at crank end—and an oil-tight crank case, with every moving part running in an oil bath—are features which insure efficiency and long life, and make this an economical unit for permanent service.

Interchangeable liner fluid end gives capacities varying from 63 bbls. per hour at 800 lbs. pressure to 250 bbls. per hour at 250 lbs. pressure.

GASO PUMP & BURNER MFG. COMPANY

210 Petroleum Bldg.
Fort Worth, Texas

TULSA, OKLAHOMA

535 Fifth Avenue
New York, N. Y.

Year after Year Without Trouble ▲ ▲ ▲

CLARK "Super 2" Compressors serve year after year without trouble because of their unusually rugged construction. More material to insure strength and rigidity—larger bearing surfaces—correct lubrication—all contribute to the unusually low maintenance costs of these machines.

This trouble-free service, combined with drastic fuel economy effected by "Super 2" design, is ample explanation for the popularity of CLARK Super 2-Cycle Compressors among experienced operators.

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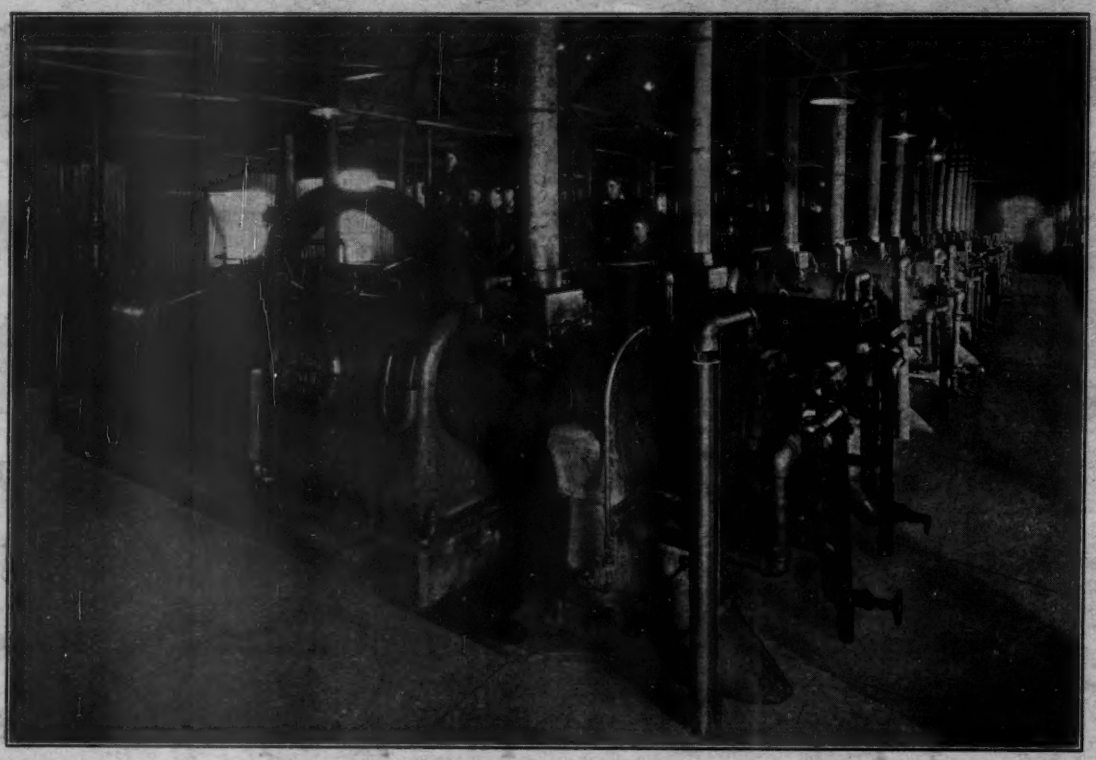

Seven 190 H. P. "Super 2a" in Plant No. 10 of the Forrest E. Gilmore Company, Little River, Okla.

At The Exposition

See the CLARK Drilling Engine, with Type G Clutch—The CLARK Gas Engine Generator Unit —and the *new* CLARK 40 H. P. Pumping Engine and compressor unit.

CLARK